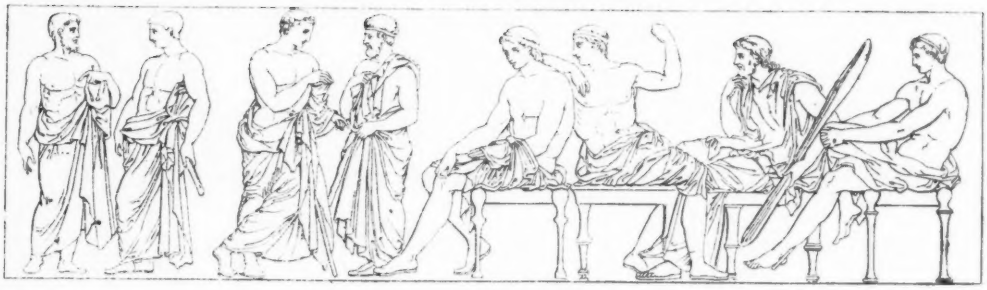


GREEK DESIGN.

By Jay Hambidge.

Read before the Royal Institute of British Architects, Monday, 23rd February, 1920.

THE last time I had the pleasure of attending a meeting of the Institute was as a guest of Francis Cranmer Penrose. The occasion was the reading of his well-known paper on the Ionic Volute in the autumn of 1902. During that year I had the advantage of many conversations with Mr. Penrose on the subject of Greek architecture, and he permitted me to take his original notes and drawings on the Parthenon and use them in my London studio for many months. Together we discussed his then pet subject, the Ionic Volute, from many standpoints. I couldn't agree entirely with his hypothesis that the spiral was probably produced by unwrapping a string from a wooden cylinder cut in the form of a stepped cone. Following a conversation on this point I visited the British Museum next day and found compass marks on the unfinished eye of the volute from the column head from Ephesus. These marks were arranged on octant lines drawn through the centre of the eye. They appeared so clean and unweatherworn, however, that I suspected they might have been made by modern investigators. An Ionic head from Priene, however, well weatherworn, showing the same condition as the head from Ephesus, convinced me that the volute curve was produced by octant circle ares, at least during later classic days. Photographs and squeezes were made for me of these two " eyes " at the time, but, as the find was a minor part of my general investigation of planning methods, I did not publish it. Mr. Penrose was present when I read my first paper on Symmetry before the Hellenic Society, shortly after he read his paper on the volute. During the discussion which followed he took advantage of the occasion to assure the members of the Society that he was familiar with my method of procedure, declared that it was scientific, hoped that the matter would not be permitted to languish, and gave the method unqualified endorsement. Many times during my conversations with the great archæologist he expressed his regret that British architects of the time were so out of touch with Greek design. Once he said, " I give you warning that it is almost impossible to revive interest in classic architecture in England." Since that wonderful summer of eighteen years ago I have critically examined the work of most Greek archæologists, but I have never found anything surpassing, or even equalling, the work of Francis Cranmer Penrose. I am astonished that his name is not more often mentioned by modern English writers on the subject. There is an abundance of citation of German authorities, but of Penrose very little. However, it remained for a German to refer to his work at Athens as " the pearl of archæological research." (See Prof. Wm. H. Goodyear's *Greek Refinements*.)

When we measure the greatest length and the greatest breadth of a Greek temple, a Greek unit of pattern, a Greek bronze or a Greek vase of the best period, we obtain the end and side of a rectangle. The lines which we thus obtain are almost always incommensurable or unmeasurable one with the other. As areas, however, these rectangles possess a fascinatingly curious commensurability. They are extremely easy to construct and, moreover, belong, or may be reduced, to one or two classes.

Further, we almost invariably find that the details of a Greek design are logical parts of its containing rectangle. In fact this is the acid test by which we determine the grade of planning knowledge possessed by the classical designer. For example, if we measure the greatest height and the greatest width of a fine vase in bronze or clay we find that the width of the foot, its height, whatever definite sub-divisions there may be, the width and height of the lip, the height and width of the neck, and, in the great majority of cases, the ornamental band usually found underneath pictorial compositions, are all logical and direct sub-multiples, of a peculiar kind, of the containing or overall rectangle. If this doesn't prove to be the case, then the example is excluded as an exception.

When Greek designs were first measured the astonishing fact was revealed that the measured lines were incommensurable—*i.e.*, one line could not be divided one into the other. In later days certain enthusiastic archæologists claim to have discovered round numbers in some Greek measurements. It has been claimed, for example, that the stylobate flank was exactly 200 Olympic feet. Without questioning the accuracy of the modern interpretation of the Olympic foot, or accepting it as established, the fact remains that other lines of the ground plan, such as the façade width, the enclosing or sub-dividing lines of the cella, etc., cannot be divided into this so-called line of 200 feet. But, if we take this same temple plan and consider the rectangle it furnishes, also the rectangle of the plan of the cella and the column arrangement, we see immediately that they belong to a class of rectangular shapes which seem to have been well known to Greek designers for generations. Moreover, we recognise at once that the architect of the Zeus temple used a different type of rectangle from those we find on the Acropolis at Athens. Theoretically we should find round numbers in some shape in Greek design, but it is not likely that we shall find them more than once or twice in any specific example.

This is a very astonishing situation. As practical men, we know that, before works can be carried out by workmen, some measuring method must be employed which produces commensurability. For this purpose we use the foot or the metre, and divide it into even fractional parts. An exhaustive investigation of classic design shows clearly that in the early part of the sixth century B.C. Greek craftsmen were using a measuring method wherein commensurability of lines was an essential feature. And that some time during this century a change was made from the older to a newer system. The essential base of this new method was incommensurability of lines, but measurableness of area. The first system depended upon a unit of some sort. It is not necessary for us to know what this unit was; it may have been a cubit, a foot, a hand, or something quite arbitrary. The point to bear in mind is that measurableness of line or area will always remain measurable, no matter what the unit may be. A diagonal to a square in relation to a side, for example, will remain a diagonal to a square whether we use a foot, a metre, or any other length unit, or whether we fix it arbitrarily by construction. It is because of this fact that we are able to create an instrument for analysis which will determine accurately the character of a measuring scheme in any terms we may decide to select. The determination of the character of a measuring method in design in reality means the determination of the grade of *symmetry*, using the word in its Greek sense of analogy or relation of part to whole.

In this connection it is advisable to stress the point that design means very much what the word implies—that is, *intention*. Before we recognise a design as such there must exist in it an arrangement of elements of some sort which bear to each other and to the whole some degree of relationship. This may be conscious or unconscious on the part of the creator of the design. That there was intention on the part of the designer to make this relationship depend upon a definite proceeding, at certain periods of man's design history, we know, because treatises written upon the subject, as well as plans themselves, have survived. For the purpose of determining the grade of symmetry in a design, however, there is nothing better than the design itself, providing that we have the proper instrument for analysis. Recognition of the necessity for such an instrument led the writer, some twenty-three years ago, to undertake an examination of the bases of symmetry in nature. Five years later, in the autumn

of 1902, a preliminary paper upon the subject was read before the Hellenic Society in London. At this time a minor phase of symmetry phenomena had been formulated. Later, during the winter of 1913, the entire scheme was developed and arrangements made for the reading of a concluding paper before the same Society, during the autumn of 1914. The coming of the war caused a postponement until 1919.

Examination of natural symmetry developed the fact that there were but two phases of this phenomena which could be of use to design. One of these is observable in the crystal and in other regular pattern forms. The snow crystal is an excellent illustration. Because of certain characteristics this was given the name of *Static Symmetry*. The other phase is to be seen in the phenomena of leaf distribution in plants, and in the curious assymmetrical balance of form in the shell. This, because it appeared to be the orderly arrangement of elements in growth, was given the name dynamic symmetry.

Examination of man's design efforts developed the striking fact that there existed a parallel between these and nature. It was found that the static type was more or less spontaneous; was indeed the type used consciously or unconsciously. This type, very often, is apparent by inspection, and in such cases it is not necessary to measure a design. It is difficult to believe, however, that the *dynamic* type could be employed unconsciously. When the general principles inherent in these two types of symmetry had been worked out, and their operating technique developed, it was found that the static was the type existing in the design products of all nations excepting the Egyptian and the Greek; also that it is historical that the Greeks had practically exhausted many phases of this dynamic type, probably as early as the beginning of the fifth century B.C.; that, as early as the fifth, some think the eighth, century B.C. the Hindus were familiar with many of the basic facts of dynamic symmetry. We learn this from an early Hindu work which has survived termed Sulvasutras. "The term *Sulvasutra* means 'the rules of the chord,' and is the name given to the *Kalpasutras*, which treat of the construction of sacrificial altars." Those curious to read about this interesting matter should consult *Indian Mathematics*, by George Rusby Kaye, Calcutta and Simla.

The Indian phraseology in this old work, in the light of dynamic symmetry, is of curious interest. Some of it is:—

(1) A chord stretched across a square produces an area of twice the size.

(2) Take the measure for the breadth, the diagonal of its square for the length; the diagonal of that oblong is the side of a square the area of which is three times the area of the (generating) square.

(3) The diagonal of an oblong produces by itself both the areas which the two sides produce separately.

(4) This is seen in those oblongs whose sides are three and four, twelve and five, fifteen and eight, seven and twenty-four, twelve and thirty-five, fifteen and thirty-six, etc.

The oblongs described in (1) and (2) are root-rectangles, and are identical with those we know, from history, that the Greeks worked out. The Greek phraseology, however, was "the determination of a square which should be any multiple of a square on a given linear base" (see Allman's *History of Greek Geometry*, from Thales to Euclid).

The oblongs described in (3) and (4) are the triangles of history by which the rope-stretchers established right-angles and "corded the temples." The 3 and 4 oblong has 5 for a diagonal, 12 and 5 has 13, 7 and 24 has 25, etc., etc. It will be noted that the Hindu uses the term oblong. This immediately suggests the Pythagorean rule for the determination of right-angles by numbers, beginning with odd numbers. Take an odd number, say 3, square it and subtract unity, divide the result by 2: 3 multiplied by 3 equals 9, and 9 minus 1 equals 8, 8 divided by 2 equals 4, the second term; add unity, to obtain 5. This is the celebrated 3 4 5 triangle of Pythagoras, which has been in use for fixing right-angles from early Egyptian days to the present. Later Plato supplied a rule for finding right-angles beginning with even numbers (see Ballo, *Short History of Mathematics*). I have

seen a carpenter in America establish a right-angle by a rope divided into twelve parts, and lay out his plan on the ground for a garage. Asked for the meaning of the proceeding, he replied that he supposed everybody knew the principle; he had known it since apprentice days. The historical method was to take a rope divided into twelve units; place three of these along an established line, four the other way, and permit the remaining five units to form the hypotenuse. This consideration of the right-angle leads us immediately to the crux of the matter of symmetry in Egyptian and Greek design, and one of the most interesting glimpses of ancient craft practice is furnished by the etymology of a Greek word. An explanation of this point will be found in Gow's *Short History of Greek Mathematics.*

"The Greek philosopher Democritus is quoted by Clement of Alexandria as saying: 'In the construction of plane figures (lit., composition of lines), with proofs no one has yet surpassed me, not even the so-called Harpedonaptæ of Egypt.' It was evident, of course, that these Harpedonaptæ were famous geometers, but Professor Cantor has first pointed out that their name is compounded of two Greek words and means simply 'rope-stretchers.' He explains their function in the following way: 'There is no doubt that the Egyptians were very careful about the exact orientation of their temples and other public buildings. But inscriptions seem to show that only the north and south line was drawn by actual observation of the stars. The east and west line, therefore, was drawn at right-angles to the other. Now it appears, from the practice of Heron of Alexandria, and of the ancient Indian and probably also the Chinese geometers, that a common method of securing a right-angle between two very long lines was to stretch around three pegs a rope measured into three portions which were to one another as 3 : 4 : 5. The triangle thus formed is, of course, right-angled. Further, the operation of rope-stretching is mentioned in Egypt, without explanation, at an extremely early time (Amenemhat I).'"

Sir Norman Lockyer, in his *Dawn of Astronomy,* furnishes us with some pertinent Egyptian wall inscriptions bearing upon this matter of "cording the temple." It seems to have been an important ceremony, and the king, accompanied by the appropriate goddess, drove the pins with a golden hammer.

The historians tell us that the Egyptians were regarded by the Greeks as masters of figure dissection. From the above the rope-stretchers must be included in this class. The present investigation of design bases suggests unmistakably that these rope-stretchers were equivalent to the modern surveyor. Herodotus tells us that the annual overflow of the Nile destroyed property boundaries and created much confusion and dispute. To re-establish these boundaries frequent re-survey was necessary. If rope-stretching was a recognised science as early as the time of Amenemhat I. the beginning of the practice must have long antedated that period. It must have taken many centuries to develop skill so publicly recognised.

Dynamic symmetry shows us that it must have been out of some such practice as rope-stretching or surveying that the basic ideas of correlated or formal design in both Egypt and Greece developed. We may take any one of the right-angled triangles which are obtainable from the rules of Pythagoras and Plato and obtain readily, and with the utmost accuracy, all the proportions which we find in classic design.

It will probably have occurred to the audience that dynamic symmetry, in its essentials, is simply a method of measuring. This is indeed true. Design analysis in general shows that the spontaneous method of measuring is linear. In our day we use the linear unit; but this method produces static symmetry of the most commonplace kind. A much better grade of the static variety was used during the Middle Ages. The facts appear to justify the assumption that some genius, undoubtedly in Egypt, but possibly in Greece, after a linear scheme had been in use for some time, made the extraordinary discovery that another method of measurement was possible: that a diagonal to a square, used in relation to a side, produced shapes which, while incommensurable as lines, were delightfully

measurable as areas. The fascinating series of root-two shapes which Greek design supplies rest upon this side and diagonal relationship. Later still some other observant designer hit upon the idea that the diagonal to two squares, in relation to the side of one of the generating units, supplied a much more powerful and flexible method of area measurement. This latter method is the most satisfactory scheme so far discovered for correlating the elements of design.

To us the interesting aspect of the matter lies in the fact that a diagonal to two squares is the base of the phenomena of leaf distribution in the vegetable world. Modern botanical research has sufficiently established this.

Owing to his understanding of a method of measuring by areas so simple—indeed, that a string and a few pins or a string merely held in the two hands is all the instrument necessary—the Greek designer had knowledge of an infinite series of remarkable shapes entirely unknown to the modern designer. We may use strong emphasis on this point because extraordinary precautions have been taken to ensure accuracy of results. The Parthenon at Athens, of course, stands on Penrose's measurements. When we consider the ground plan of this building as a rectangular area (this area must include the Euthynteria or lowest levelling course), and divide the end into the side, we obtain a ratio which is immediately recognisable as belonging to the series of dynamic shapes mentioned. Penrose was most painstaking in his survey of this building, so we may take his figures, and without making a drawing or diagram prove the correctness of the measurable area scheme by a little arithmetic. When we follow out the logical process of subdivision, which is a peculiar property of this particular rectangle, we find that every detail of this ground plan forms part of an arrangement wherein the basic design idea is similarity of figure. The main motive is a square plus an area obtained from a diagonal to two squares. The principle by which the subdivisions are obtained depends upon establishing a reciprocal to the major area. This idea of a reciprocal to a shape seems to be quite unknown to modern design, but there is overwhelming evidence that Greek designers thoroughly understood it. The division of the area of the Parthenon ground plan results in an arrangement of similar figures in which the column centering plays the most important part : this includes the relationship of the neighbouring columns to the angle columns. The error throughout is the error of workmanship, as Penrose's measurements disclose it. After the ground plan we may take the façades and all their details, such as columns, architrave, triglyph, and metope or pediment. Further, we may unfold the buildings—*i.e.*, place the front and side elevations, with half the roof on either side, in two-dimensional position on the four sides of the ground plan and obtain another larger rectangle. In this shape every superficial square inch of the exterior of the building may be inspected. This new rectangle will be found to belong to the same base as the rectangle of the ground plan. In other words, the building supplies us with an area theme of a peculiar character. Moreover, it is easily proven that this particular theme has a base in nature.

During the past year and a half Dr. L. D. Caskey, Keeper of Greek and Roman Antiquities of the Museum of Fine Arts, Boston, has devoted his entire time to the preparation of a large volume on the Greek pottery under his care, wherein the whole fabric is scholarly and exhaustively treated in the light of dynamic symmetry. Dr. Caskey's work is corroborative in every detail of the dynamic theory. At the Metropolitan Museum of Art, New York City, Miss G. M. A. Richter, Keeper of Greek and Roman Antiquities, took unusual precautions to obtain reliable measurements. The pottery was first measured in detail by a secretary and a rough sketch made of the example. This material was sent to me at Boston. From these measurements I quickly determined the grade of symmetry of each example. An expert draughtsman, with the assistance of a few specially prepared instruments, made an accurate drawing of the projection of each example. These were also sent to me, the drawings being first inked, so no changes could be made. If these drawings and measurements did not coincide the example had to be reinspected. Later I made an interpretation of the straight line and curve proportions of all the examples. It should be borne in mind that it is not necessary to make a drawing

of any example of Greek classic design : a few measurements settle the matter. So far classic design shows something like 80 per cent. based upon a diagonal of two squares as a measuring base ; approximately 10 per cent. on the diagonal to one square, 5 or 6 per cent. static, the remainder indeterminate.

We obtain the same percentage from the British Museum. I have been gradually obtaining examples of Greek bronzes of the best period, both here and in America. The results show even a higher quality of symmetry than the pottery. I stress the importance of the Greek vase because it has developed that this pottery is the only pure architectural pottery. Almost nothing is known about the shapes of this extraordinary fabric, while volumes have been written on the paintings or drawings on them. The Greek vase compels our admiration, and has persisted as an object of rare beauty probably because of its exquisite proportions and shape. The paintings are often inferior. Professor Baur, of Yale University, has pointed out that the Greeks themselves thought thus because we find more signatures of designers than of painters. Edmond Pottier, Keeper of Greek and Roman Antiquities in the Louvre at Paris in 1906, had to say of the proportions found in Greek vases :—

" I will add that the proportions of the vases, the relations of dimensions between the different parts of the vessel, seem among the Greeks to have been the object of minute and delicate researches. We know of cups from the same factory, which, while similar in appearance, are none the less different in slight, but appreciable, variations of structure (n'en sont pas moins differentes par des nuances appréciables de structure) (*cf.*, for example, Furtwangler and Reichold, *Griechische Vasenmalerei*, p. 250). One might perhaps find in them, if one made a profound study of the subject, a system of measurement analogous to that of statuary. We have, in fact, seen that at its origin the vase is not to be separated from the figurine (p. 78) ; down to the classical period it retains points of similarity (*accointances*) with the structure of the human body (Salle). As M. Froehner has well shown in an ingenious article (*Revue des Deux Mondes*, 1873, c. civ, p. 223), we ourselves speak of the foot, the neck, the body, the lip of a vase, assimilating the pottery to the human figure. What, then, would be more natural than to submit it to a sort of plastic canon, which, while modified in the course of time, would be based on simple and logical rules ? I have remarked (*Monuments*, Piot IX, p. 138) that the maker of the vase of Cleomenes observed a rule illustrated by many pieces of pottery of this class when he made the height of the object exactly equal to its width. M. Reichold (c. 1, p. 181) also notes that in an amphora attributed to Euthymides the circumference of the body is exactly double the height of the vase. I believe that a careful examination of the subject would lead to interesting observations on what might be called the " geometry of Greek ceramics." (E. Pottier, Musée National du Louvre, *Vases antiques, III*, p. 659.)

The Parthenon Plan Scheme.

The Parthenon plan must be considered as a straight line or rectangular area arrangement. The curves are refinements added after the plan was developed. (See Penrose and Prof. Wm. H. Goodyear.) Dynamic Symmetry shows us that a Greek design must be considered in its totality—*i.e.*, the entire or overall dimensions must be contained exactly in some definite rectangle. For a Greek building these overall dimensions must include the Euthynteria or lowest levelling course. The width of the end of the stylobate of the Parthenon is 101·341 English feet. Penrose gives the width of the three steps as 4·65 feet on one side and 4·67 on the other. The width of the Euthynteria as a small step is ·33. This added to 4·65 equals 4·98 ; to 4·67 it is 5·. For convenience of arithmetical calculation we may assume that 5· is correct. Multiplied by 2 we obtain 10· English feet as the width of the steps on either side of the stylobate. The full width of the end of the rectangle of the ground plan therefore is 111·341 feet. The length of the top step on the flank is 228·154± ; with 10· added it is 238·154±.

111·341 divided into 238·154 equals the ratio 2·1382.

111·341 multiplied by 2·1382 equals 238·069, actual error ·045 feet. The actual ratio should be 2·13819±. We have a degree of accuracy here which is difficult to realise in a building built by man.

Students of dynamic symmetry will immediately recognise the ratio 2·1382 as a compound shape composed of two familiar areas which are arithmetically represented by 1·4472 plus ·691. Of the ratio 1·4472 the whole number 1· represents the area of a square and ·4472 is a root-five rectangle. The square root of five is 2·2360 and this number, normally, would be the ratio for a root-five area—*i.e.*, a rectangle the end of which is 1· or unity and the side 2·2360 (N.B.—These areas may be scaled sufficiently close for an ordinary drawing by using a metric scale). In the present case the root-five area is standing on its short end with its side against the side of a square, consequently the side is regarded as unity or 1·. The short end must be in root-five proportion to unity—*i.e.*, the area must be a reciprocal of the root-five area. This notion of a reciprocal is entirely new to modern design, but we have abundant evidence that the Greeks thoroughly understood its functions. A reciprocal of a root-five rectangle—or indeed any root area—may be obtained by dividing the number representing the root into unity or 1·0. A root rectangle always contains an even number of reciprocals. A root-five rectangle contains 5 reciprocals, root-four 4, root-three 3, root-two 2, etc.

2·2360 divided into 1·0 equals 0·4472, or

2·2360 divided by 5 equals 0·4472.

The ratio 1·4472 is now clear. The simple geometric method for the construction of this area is as follows :—

Construct a square and bisect the area by the line A B, Fig. 1, *a* [p. 221]. Draw the line B C.

This is a diagonal to two squares. Make B D equal to B E and through E draw F G parallel to B D. The area F D is a root-five rectangle. F G is equal to unity or 1·0 and G D is equal to 0·4472. In Fig. 1 *b*, the root-five area C B is added to the square A B, and A D is a 1·4472 rectangle. The fraction 0·691, because it is less than unity, must represent a reciprocal of some ratio greater than unity. To obtain this ratio we divide 0·691 into 1·0. The result is 1·4472. A reciprocal of a rectangular area is a similar shape to the whole, therefore a 0·691 area is also composed of a square plus a root-five rectangle.

The geometrical method for the construction of a 1·4472 shape plus its reciprocal is shown in Fig. 2.

A B is a diagonal to a 1·4472 area. B C is a diagonal to a 0·691 area. The two lines form a right angle at B.

General methods for geometrically determining reciprocals are shown in Fig. 3 *a* and *b*.

A C, Fig. 3 *a*, is any rectangle. A B is a square on the end of the rectangle "applied" to the area of the rectangle, and E D is a diagonal which cuts F B, a side of the square A B at G. The line G B is the end of a reciprocal to the major shape. A B, Fig. 3 *b*, is any rectangle, and D C is a diagonal, A F D is a semicircle described on A D, the end of the rectangle. The diagonal D C cuts the semicircle arc at F. Draw A E through the point F. The area A E is a reciprocal and a similar shape to the whole. Diagonals of reciprocals cut diagonals of the whole at right angles and introduce continued proportion into the area of a rectangle. E F is to F D as F D : F A : F C ; or E D : D A : D A : A C, etc. A F D is a triangle in a semicircle, and, consequently, is a right-angled triangle.

Referring to the Parthenon ground plan, A B, Fig. 4, is a 2·1382 rectangle, A G a 1·4472, and C B a 0·691 area.

A D is a square "applied" to A G, and C I, a diagonal, cuts J D at F. The line F D is equal to G B. Draw the line F H parallel to D B. C D is a root-five rectangle as is also H C. A D, B K are squares.

The area C H, Fig. 5, is a root-five rectangle. This area is composed of a square plus two 0·6180 shapes, 1·0 plus 0·618 plus 0·618. This area, represented by the fraction 0·618, is a rectangle which has been given the name, by the writer, of the "rectangle of the whirling squares," because of a certain property possessed by its reciprocals. If 0·6180 be divided into 1·0 the result is 1·6180. The geometrical method for the construction of this shape is shown in Fig. 6 *a* and *b*.

A B, Fig. 6 *a*, is a square. B C, a side, is bisected at D and D E drawn. D E is a diagonal to two squares. D F is made equal to D E. The rectangle A F is completed. This area is a rectangle of the

"whirling squares." A C is unity or 1·0, and C F is equal to 1·6180. C B is equal to 1·0, and B F 0·6180. F E is a reciprocal to F A. The square-root of five is 2·2360. If to 1·6180 the fraction 0·6180 be added, the result is 2·2360. In Fig. 6 *b*, C D is a square. D F, a side, is bisected at E and E G, a diagonal to two squares, drawn. E G is made equal to E B or E H. H C G B is a semi-circle; H C, G B are 0·6180 rectangles. A D, B C are 1·6180 rectangles. A B is a root-five rectangle composed of a square C D plus the two 0·618 shapes B G, A F.

A B, Fig. 7, is a 2·1382 rectangle. C D is a root-five rectangle, and D F an area composed of two 0·6180 shapes. To the 0·691 area B D we apply the root-five area B G, equal to C D. B K is a square, and K L two 0·6180 areas; and H F is composed of two 0·6180 areas; and J K is a square greater in area than the squares B K or C E. To the other end of the rectangle A B we "apply" the squares A M and N O, equal to the squares C E and B K. We now have by simple geometrical construction defined an area similar to the ground plan of the Parthenon with four squares, one on each corner. To obtain the numerical value of the line N L we multiply the known line A N—*i.e.*, 111·341 by 1·4472. The result is 161·1326+ English feet. B L is 111·341 multiplied by 0·691 or 76·9366 English feet. Added, the two lines give us 238·0693, or the flank length of the ground plan. The square B J is 76·9366 by 76·9366. B C is equal to 76·9366, and C P 34·4044 or the difference between 76·9366 and 111·341.

We now have for the sides of the four squares at the four corners of the plan the numerical value of 34·4044 feet. We may now consider the centering of the columns, and at the same time define the error between Penrose's measurements and the plan.

Fourteen columns from a flank give us the following measurements from centre to centre.

13·983
14·052
14·124
14·110
14·079
14·093
14·058
14·094
14·066
14·089
14·113
14·068
14·124
14·084

197·137

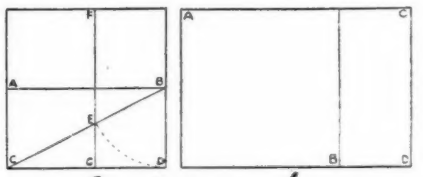
Dividing this by 14, we have as a mean 14·081 feet.

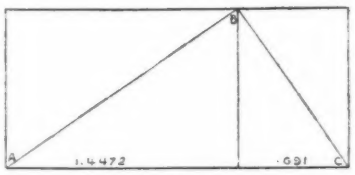
The mean distance from the edge of the top step to the centre of the second column is 15·456 ± feet. Multiplying this by two and adding 10 feet, the width of the steps, including the Euthynteria, multiplied by 2, we have 40·912 feet. This, added to 197·137, equals 238·049. The ratio measurement was 238·069. The error is 000·020—*i.e.*, two one-hundredths of a foot. It will be noted that the error by construction is always within the error of workmanship as we find it in the building. The mean distance from centre to centre of the columns is 14·081 feet. Penrose gives the distance from the edge of the top step to the cella wall in one case as 15·330, and in another as 15·350. The step width is 5·0; this added to 15·350 is equal to 20·350. If we consider the distance from centre to centre of the columns as the end of a rectangle, and the distance from the cella wall to the extremity of the Euthynteria as the side, such an area will be composed of a square plus a root-five rectangle

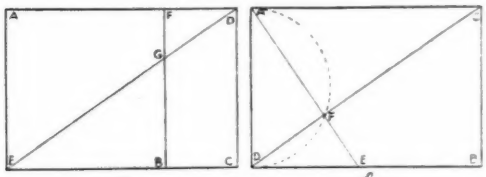
—*i.e.*, the column centering widths, extending all around the building and excluding the angle columns and their immediate neighbours, with the distance from cella wall to step base, produce a series of areas similar to the generating area of the ground plan and directly connected with it by proportion.

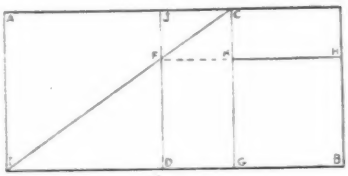
14·081 × 1·4472 equals	20·378
Penrose's figures	20·350
Error	00·028

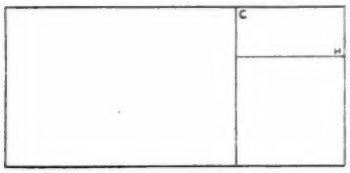
The greatest variations in the ground plan occur at the angle columns and their relation to their neighbouring columns. This was probably due to the difficulty of making adjustments for refinements, In no case, however, is it much greater than an inch, a degree of accuracy difficult for others than

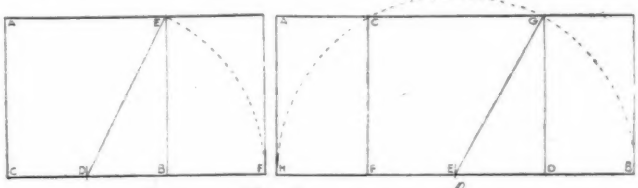


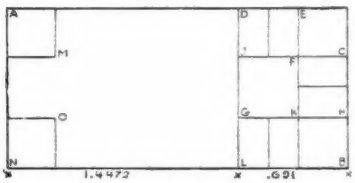


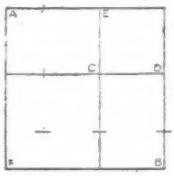


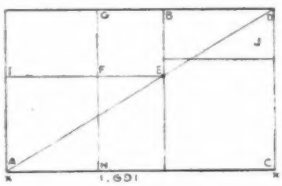


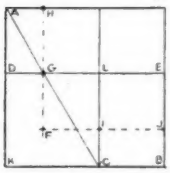


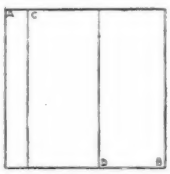


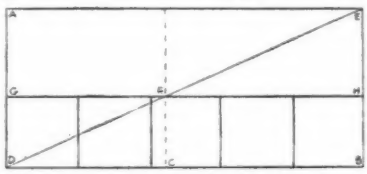












practical architects to realise. From the centre of the second column to the top step the mean distance is 15·456 ± step width 5·0, result 20·456 ; mean centre to centre distance 14·081, result 34·537.* Side of the root-five square on each corner, obtained from the generating scheme, 34·4044, error 0·1326. This approximate error probably was a factor in the increment of curvature in the stylobate. Asked once by the writer what he thought the increment of curvature or sagitta actually was, Penrose replied that it was difficult to say, though he had assumed it to be a definite amount in his book. He thought two to two and a half inches would be close enough.

We now must consider the subdividing of the corner squares to place the centering of the first and second columns in relation to the third columns. Sides of these squares pass through the centres of the third columns. Thus we have an arrangement of the subdivided area of a square as in Fig. 8.

A B is a square ; A C, B C, two areas each composed of a square plus a root-five figure ; E D, F C are squares. If A E be regarded as unity, then the areas F E or F D are composed of the square F C plus an area of a square and a root-five figure ; that is to say, 1·691. The reciprocal of this ratio (it is one frequently found in other Greek designs) is 0·5913. The area B E or A D is composed of the square E D plus the square and root-five areas A C or B C, the ratio being 1·4472 plus 1·0 or 2·4472. The reciprocal of this is 0·4087. The reciprocal ratios 0·5913 plus 0·4087 equal unity or the line F B.

To construct within a square a square plus a square and a root-five rectangle : add a square and a root-five rectangle to a square. The ratio then will be 1·691, see Fig. 9.

A B is a square, B C a square, C E, plus the root-five rectangle J B. A D is a diagonal to the entire shape. A E is the area desired within the square A B. A F is a square within the area A E. A G is a similar shape to A E. G E is a square.

The centering of the columns in relation to the step width is done by a diagonal to the 1·691 area within the square on the corner of the plan as in Fig. 10.

A B is a corner square ; A C a 1·691 area within it, and the diagonal A C of this shape cuts the line D E at G. This point G is the centre of the first column from the angle column F—*i.e.* the area G C is similar to A C. The columns G and I are closer to the angle column F than they are to the columns H and J exactly as we find them in the plan. The width of the steps on the plan is fixed by constructing a root-five area within the 1·691 areas of the corners, Fig. 11.

A B is a corner square ; A D a 1·691 area ; C D a root-five area within A D ; A C is the width of the steps.

Of course, the entire details of such a building as the Parthenon cannot be discussed within the limits of an evening's talk, especially when the subject itself has to be introduced. We must neglect the cella and the elevations with their details. It may be said, however, that the symmetry of all these conforms strictly to that of the ground plan. Moreover, the area arrangement we find in the Parthenon was not new to Phidias or Ictinus close inspection of the symmetry of over a thousand examples of Greek design from the sixth century to the first century B.C. shows that the motif or theme found in the Parthenon appears many times in designs previously made.

It should also be remembered that analysis is not synthesis. It is often a perplexing matter to follow a cold trail, while the trail itself was easiy and simply made. The evidence appears to indicate that these proportions of dynamic symmetry were the outcome of a method of surveying by area wherein a diagonal to two squares formed the base. The figures given above may be varied slightly and the errors reduced because it is not always clear what the exact measurements were. According to Penrose, the plan is not an exact rectangle—is any building plan exactly rectangular as it is carried out in the work ? The stylobate on each front is 101·341 for one, and 101·361 for the other ; the flank length on one side is 228·154 for one, and 228·141 for the other. If we take the double step width as 10·0, and use 111·361 for the end and 288·141 for the side of a rectangle, the ratio 2·1382 leaves an error

* By construction we obtained 34·4044 for the side of this square. If we consider 20·350 plus 14·081, or 34·431, as the side of this square the error is reduced to 00·027.

of 3/100ths of a foot. Many confusing points of this character can only be cleared by another inspection of the building as it stands.

It may be added that the following ratios connected with 1·4472 and 0·691 appear in façades and details :—

Width of front, 111·341.

Height of façade by construction, 64·60±.

The lesser divided into the greater produces the ratio 1·7236. The fraction 0·7236 is equal to 1·4472 divided by 2. Penrose gives the average width and height of the triglyphs as 2·766 and 3·840. The lesser into the greater gives the ratio 1·382 (error 0·018). The reciprocal of 1·382 is 0·7236, or again 0·691 multiplied by 2. If the metopes were originally planned as squares, then metope plus triglyph is a similar figure to the façades, or 1·7236. The height of the angle columns, minus increment of curvature, is 34·250, the width of the abacus 0·685 ±; the lesser into the greater gives root twenty-five or 5 squares. The area factor which supplies all the details of the column head is root-five.

Root 25 equals	5·000
Root 5 equals	2·236
	2·764 difference.

The difference 2·764 divided by 4 equals 0·691 ; or by 2 equals 1·382. The five squares of the angle columns are obtained by simple construction from a root-five area of the plan, see Fig. 12.

A B is a root-five rectangle ; A C an " applied " square on the end. D E is a diagonal : it cuts a side of the square A C at F. D H is an area equal to the area of the square A C and is composed of five squares—*i.e.*, it is a root-twenty-five rectangle.

To those unfamiliar with the present method of analytical proof by arithmetic the process may seem complicated. It is, however, quite the reverse, as a little familiarity with the method will prove. Very early in his work the writer found that geometrical analysis was fallacious in every way ; it invariably results in mere playing with lines and shapes. With it rigid proof is impossible. As the method by arithmetic now stands we may determine with great accuracy the symmetry of any design whatever without making a drawing. Diagrams and drawings are used to help the student visualise the facts and have nothing whatever to do with the proof.

DISCUSSION ON THE FOREGOING PAPER.

Mr. JOHN W. SIMPSON, *President*, in the Chair.

Sir CECIL H. SMITH, LL.D. [*Hon. A.*] (Director of the Art Division, Victoria and Albert Museum), in proposing a vote of thanks, said he took a profound interest in the industrial arts and welcomed very much indeed the views which Mr. Hambidge had put before the meeting. If only architects could be got to take them up, we should once again find them designing for the industrial arts. The reason why the industrial arts had declined in the immediate past was largely because of the absence of architectural art in the designs. The Hindoo history of architecture showed us that the average Hindoo architect, in the past at any rate, was always expected to be a master of at least one other art. He was responsible not only for the architecture and decoration, but also for the warming of the building. In Persia the architect was, as a general rule, a mason, and in India both mason and carpenter. Judging from the evidence he had gathered from Mr. Hambidge's work and also from the result of his own researches at the British Museum, it seemed to him that Mr. Hambidge by his theory of commensurability of areas had hit upon an extraordinarily interesting truth. He was not clear, however, whether Mr. Hambidge meant that the artist of ancient Greece who made the vase or the small bronze was acting on this dynamic law, or whether he did it more or less intuitively, because he was so accustomed to seeing everything designed from that point of view that he would hardly fail to do the same himself. It was hardly conceivable that a Greek potter, a man of the lower orders, should have been conversant with the Books of Euclid and capable of working out the exact lines, determining the rectangles, squares and reciprocals on which the Greek vase was produced. However that might be, Mr. Hambidge's theory deserved the fullest consideration by the artists of this country.

Sir RICHARD PAGET, K.C.B. [*Hon. A.*], in seconding the vote of thanks, said that, personally, as

one who was interested in design, the ideas which Mr. Hambidge had put forward were certainly most instructive and opened the door to an entirely new set of ideas. The notion of measuring areas instead of lengths and breadths was fundamental and interesting. He was sure it would have a most useful effect on all who were interested in proportion and design: they would see in it not only a basis of good design, but also of good craftsmanship, on which, ultimately, good design rests.

The PRESIDENT, in putting the vote of thanks, expressed the appreciation of the meeting of Mr. Hambidge's patient and learned exposition of the principles wherein he believed himself to have found the solution of the mysterious perfection of Greek art. If all were not convinced, it was doubtless owing in some degree to imperfect mathematical perception, not to the lecturer's clear explanation. He, for one, was not prepared to challenge him in a mathematical debate. A distinguished critic had expressed surprise that the Royal Institute should devote an evening to these purely theoretic problems. The answer might be given by Symonds' apothegm, "Learning cannot come amiss to those who understand its use." At this late hour [11 o'clock] he would content himself by observing that the term "symmetry," which Mr. Hambidge used so freely, required some definition before they qualified it with such adjectives as "static" and "dynamic." Mathematical "proportion" was not artistic proportion: the first was absolute, the second spiritual; not axiomatic, but a matter of delicate personal perception, none the less definite that it could not be reduced to rule, varying to infinity according to situation. It was really a sixth sense; no two figures, no two plants, no two buildings, were alike. But, the connection between accepted beauty of proportion and the human figure was, to his mind, undoubted.

Mr. HAMBIDGE (in reply), answering the point raised by Sir Cecil Smith, said that men who were restricted in their design output must, if they were sincere, act more or less according to a certain line, and it was not a question whether they were conscious of what they were doing if they produced their results and if their rudder was set in a certain direction. Musicians worked according to certain lines, and did astounding things. Some curious things in Greek pottery had been discovered which were unsuspected, and they were led to question the idea of critics that these potters were such ordinary men. For example, there was a man named Tleson, who was the son of a potter, and the brother of a potter. Dr. Caskey, in Boston, had found a delectable kylix made by him; apparently he always signed his work. This man Tleson made kylikes all his life: he made black-figured pots. But there was one red-figured pot by him at Naples. He had noticed in the British Museum, in Catalogue 4, other examples by him. The three examples he had seen were corroborative of Dr. Caskey's example in Boston. They showed a man struggling between the static type of what seemed to be a fairly late date, and one where he had almost reached the point of change. The example in Boston showed a complete change. When at Cambridge the other day, he noticed, in the Fitzwilliam Museum, another Tleson kylix. He measured it, and found it was an exact duplicate of one in the British Museum, the only difference being a slight one due to a shrinkage in the clay. It was static, because it was designed in two squares, and men did not make two squares fortuitously. The one in the British Museum and the one in the Fitzwilliam Museum were exactly a square-and-a-half; every detail was explicitly in the terms of two squares or a square-and-a-half. The one in Boston showed the dynamic arrangement. In Tleson's work, they had almost perfect examples of a man first using a measuring scheme of the linear unit, changing to one of an incommensurable linear scheme, and one of a commensurable area scheme. He thought the architects in New York had done the best thing: they immediately subscribed for eight lectures, and every possible angle and point had been thrashed out. The only thing to do was to take these examples and go into them analytically, have them explained with the drawings made by disinterested people, with all the measurements accurate. If they did that, a revelation awaited them. The human-figure question of type measurement was opposed to everything understood in modern times. The great mistake was made by Vitruvius, a Roman, who said in his book on Architecture that the Greeks were carrying out certain principles of Greek symmetry that they derived from the human figure, and they were said to do this because members of the human frame were commensurable with the whole, and he assumed it was commensurable with the line. That had persisted to this day, with the effect of corrupting everything which had been written on the human figure for two thousand years. If we took the skeleton, or the live figure, and interpreted the area, we had something which was entirely unknown before.

REVIEWS.

THE LABOUR-SAVING HOUSE.

"*The 'Daily Mail' Ideal Labour-Saving Home.*" *La.* 4*o.* 1920. 5*s. net.* [*Associated Newspapers, Ltd., Carmelite House, Carmelite Street, E.C.*]

Whatever are the results of such a competition as that instituted by the *Daily Mail* for the best labour-saving house, there can be no doubt as to its usefulness as a stimulant to thought in a very important direction. If the use of electricity had been encouraged to the full by the authorities and the public we should probably in that way alone have advanced in a very material degree towards labour-saving reform. As it is, we have much to be grateful for in the enterprise of gas producers for much improvement in household efficiency and comfort. It is obviously of great import-

ance that the architect should so design his building as to save labour and economise space and to take the fullest advantage of every labour-saving device : in doing so, however, he is in some danger of losing architectural values by concentrating too much on a small space and missing that air of comfort and pleasant proportions which is so essential a feature in a good home. It is well that all the more notable designs and details which the *Daily Mail* competition has drawn forth are now available in book form, which has just been issued. With commendable clearness and good arrangement we have here about 70 well-filled pages which deserve study and critical consideration. Hints of value are here in plenty, both of what to adopt and what to avoid, for there is probably not one design which could be fully commended in all essentials, clever as many of them are. For instance, the first-placed design fairly bristles with cupboards and is most economically planned, but the sizes and proportions of the rooms and the rhythmical placing of the windows may be said to break the link between the practical and the artistic which we all desire to see. Where economy and labour-saving are the essence of the scheme we might have asked to be saved the raised parapet wall in the centre of the front, and have somehow got a little better light into the service lobby. The plate-glass balustrade to the stairs with its bronze mesh may be more readily cleaned than nicely turned balusters, but in this case one might argue that one would prefer to endure a little extra labour. Of all the houses shown I think I should prefer to live in and to look at that by W. A. Greener, though another design has a w.c. for each of the four bedrooms, and another the appearance of a small town hall. It would be impossible in a brief notice to do justice to the skill of so many competitors ; but for those who have not won a place and for those who did not compete it is consoling to know that there is a vast amount of room yet for well conceived architectural effort in this subject.

T. Raffles Davison [*Hon. A.*].

CORRESPONDENCE.

The Future of Architectural Education.

8, *Grafton Street, Bond Street, W.*1.
6th March, 1920.

To the Editor, Journal R.I.B.A.,—

Sir,—As one of the number—a fairly large number, I should judge—of unofficial members who wanted to take part in the discussion of Mr. Waterhouse's paper on 16th February, and found no opportunity of doing so, I should like, if it is not too late, to offer some remarks in the form of a letter.

Charming as Mr. Waterhouse's discourse on " The Future of Architectural Education " admittedly was, I, for one, felt somewhat in the position of the hungry sheep who look up and are not fed. I had hoped, after the interval of years during which the war has kept me out of touch with the trend of architectural thought, to learn in what direction progress was tending, what fresh ideas were coming into being, what hopes and fears existed for the future where education was concerned. Instead of this, I found myself listening to a discourse, not on the future of architectural education, but on the future of architectural examinations, which is hardly the same thing.

This, I confess, disappointed me, and I was further disappointed when speaker after speaker, or—to be more accurate—professor after professor, got up to declare that all was for the best in the best of all possible examinations. I gathered from sounds of dissent which came from the back part of the hall, where the younger members gather, that I was not alone in my disappointment, and I own that my sympathies are on the side of youthful impatience. I am, it is true, no longer young, but I can still be impatient.

Looking through the syllabus of the examinations I feel there is still room for a vital improvement on the educational side. I cannot go as far as my old master, George Aitchison, who declared that nothing should be taught but construction, though he did not make me the subject of an experiment in that direction. But I do suggest that the archæological side of architectural history, which I see is still insisted on in the Intermediate Examination, should disappear, and the history of architecture be taught, not according to Fergusson or Fletcher, but according to Choisy : the history of architecture, that is, as arising from structural development and necessity, with insistence on the importance of proportion and congruity—the importance of style, in fact, and not of styles.

I do not think that, if this radical change is made, we need fear any dearth of men to interest themselves in the detailed history and archæology of architecture, and hand on the torch of learning, for nothing will prevent men with such tastes from pursuing their studies on this side of their profession in conjunction with the practice of it. It is later in the student's life that such studies can be most efficiently pursued, and I think that if proper encouragement is given later, this side of architectural education may safely be left alone at first. The proper encouragement would be to make it possible, if not obligatory, for travelling students to publish some monograph, either on an individual building or a branch of some period. The Institute might print this, in some such *format* as that of the Journal, bound in paper, and with plenty of illustrations. In this way a body of detailed and accurate information, which is now lost, would be built up, and the reproach removed which the absence of such publications brings down upon British scholarship.

In this way, I think, it would be possible to meet the objection which my proposal is sure to evoke, and at the same time do a service to the cause of architectural education in general.—Yours faithfully,

Ambrose Poynter [*F.*].

"Dividing the Profession."

Tunbridge Wells, 9th March, 1920.

To the Editor, JOURNAL R.I.B.A.,—

DEAR SIR,—In my opinion it is a matter for regret that Mr. Payne should have written in such a depreciatory manner regarding the Licentiate class of member. Moreover, to state that they were elected without any qualifications is quite incorrect. Not only were exhaustive inquiries made as to their standing and history, but, if I remember aright, not less than three sets of working plans and designs of different works or buildings actually designed and carried out by themselves had to be submitted to the Examining Body before their claims were considered. I well remember the remarks of a member at the time anent these examinations; he considered that the fact that plans of works actually designed and carried out by the candidate were passed by the Examining Committee was a greater proof that the former possessed the qualifications to practise than the student who had passed the technical examinations of the Institute but had no practical experience or personal responsibility in carrying works through. I think there was some truth in his remarks. At any rate, the Licentiate appears to have done pretty well in competitions, and when up against Associates, too. Even in the recent Housing Competition the Licentiate was "on top," and the writer could give a personal instance. It is a dangerous thing to write in such a strain as your correspondent has, for sometimes it may have a boomerang effect. Yours faithfully,

HENRY ELWIG, *Licentiate.*

Bedford Park, W.4: 13th March, 1920.

To the Editor, JOURNAL R.I.B.A.,—

DEAR SIR,—Without any disrespect to Mr. Sydney Perks I ask to be excused at the present moment for declining to discuss at length the subject of his letter printed in your current issue, because it is my last wish to hamper in any way the cause of the desirable unification of the profession, concerning which a scheme is to be brought forward at the meeting convened by the Council for 22nd March. Whenever I have found myself in agreement with Mr. Perks I have not hesitated to say so, and he will remember that I willingly co-operated with him in other ways which I need not mention now. I therefore with the more assurance can claim his forbearance at this time. I am not in the least shirking either the subject-matter or the details which he has thought fit to print by way of retort to my last letter. He says that if I had inquired into the genesis of the Report issued under seal and published in the JOURNAL on 10th December 1904 about Official Architects, it would have spared him the trouble of looking up "some old papers" (showing presumably the hole-and-corner character of the whole thing). As it happens, I inspected the published proceedings and gave references accordingly, but the minutes of the Committees and Council Meetings held when this matter was considered and decided have never been published and therefore are not available to ordinary members. It is, however, difficult to accept the condensed extract furnished from the minutes by Mr. Perks as covering what took place when the Allied Societies discussed the report and authorised their Presidents to sign it, as well as the President and Council at headquarters.

I began this correspondence in your pages on 20th December last in consequence of the attitude of the minority at our General Business Meeting held on 1st December, when they charged the Council with risking a division of our ranks. Attempts to belittle any manifesto authorised by the Institute are obviously calculated to inspire discord and do more harm than good. Till this report dealing with the position of Official Architects has been amended or rescinded it remains in force. This is the constitutional position. With Mr. Perks's permission let us, therefore, leave the subject at that and try to further a comprehensive plan for unity of action for our craft.—Yours faithfully,

MAURICE B. ADAMS [*F.*].

PHILIP COLDWELL THICKNESSE [*F.*].

The late Mr. P. C. Thicknesse was born on 28th January, 1860. He was the third son of Bishop Thicknesse, who is still living, at the age of 91, at Peterborough, and of Anne, the daughter of Mr. R. A. Thicknesse, for some years before his death M.P. for Wigan. He was educated at Marlborough College and after leaving school was articled to Mr. R. Norman Shaw, R.A., from whom he absorbed, himself an eager and vigorous man, the enthusiasm in his profession which was shared by all the pupils of that distinguished architect. In 1884 he entered into a partnership with Mr. W. E. Willink under the style of Messrs. Willink and Thicknesse, a partnership which lasted until his death.

Mr. Thicknesse in his work displayed unusual versatility. He was an incessant worker, and enjoyed his work, the result being to him of greater importance than the reward. He was responsible for much domestic work, a good deal of ecclesiastical work, educational work of various kinds, elementary schools, secondary schools, public schools and university laboratories, and one of his great joys was to design the decoration of liners, in which he had great experience. His most important work was the Cunard Building at Liverpool, which has been much praised by all professional men who know it.

Mr. Thicknesse came of a notable family who from father to son for over 500 years occupied the same old manor near Crewe, on the borders of Cheshire and Staffordshire. He married Clara Margaret, the eldest daughter of John Oakley, the well-known Dean of Manchester. Mr. Thicknesse had the invaluable quality of making friends wherever he went, of people in every rank, and he will be greatly missed by many of the contractors and workmen who carried out the work he planned.

W. E. WILLINK [*F.*].

9 CONDUIT STREET, LONDON, W., 20*th March* 1920.

CHRONICLE.

R.I.B.A. Roll of Honour.

The following names for the Roll of Honour [see JOURNAL 10th January] have been kindly notified :

Fallen in the War.

AITKEN, JAMES HUNTER, Lieut., Black Watch [*Student*]. Killed in action.

BEATTIE-BROWN, WM., Capt., Northumberland Fusiliers [*Licentiate*]. Killed in action.

SKIPWITH, FRANK PEYTON, Major, Royal Scots Fusiliers [*Licentiate*]. Killed in action.

SPURWAY, GEORGE VYVYAN, M.C. [*Student*]. Killed in action.

SWINTON, JAMES GIBSON, Lieut., Black Watch [*Student*]. Killed in action.

War Honours.

BLUHM. QUENTIN MANGNALL, Major [*F.*]. Awarded the D.S.O. for gallantry in action in Gallipoli, June 4th, 1915, when he was severely wounded.

The *Court Circular* announces that at the Investiture held by the King at Buckingham Palace on the 17th inst., Lt.-Col. Peter G. Fry, D.S.O. [*F.*], was introduced into His Majesty's presence and invested with the Insignia of the Most Distinguished Order of St. Michael and St. George.

Mr. Hall's Paper on American Department Stores.

The Paper on American Department Stores read by Mr. Austen Hall [*F.*] at the Institute on the 15th March represented the gist of the material collected by the author during a visit to the United States in the autumn of last year for the purpose of his Report as Godwin Bursar, 1919. A condition attached to the Bursary is that the holder shall make a visit of not less than five weeks' duration to some part of Europe or America, especially to study, examine and report on some of the best specimens of modern planning, modern modes of construction, drainage, water supply, ventilation, etc. Mr. Hall chose as his subject of study the planning of the best types of American store buildings, and visited for his purpose New York, Philadelphia, Boston, Chicago, Washington, and other cities. The planning, construction, general arrangements, fittings, and other details of the most typical of these buildings were described by Mr. Hall at the meeting last Monday, and were illustrated by an interesting series of slides, some of them expressly prepared for the occasion and others kindly lent by Mr. Gordon Selfridge. Among the visitors present were Mr. Gordon Selfridge ; Mr. R. Millbourne and Mr. H. L. Cabuche (Messrs. John Barker and Co.) ; Mr. G. M. Phillips (Peter Robinson, Ltd.), Mr. C. Rowley (Messrs. Debenham), Mr. H. J. Clarke (Messrs. Selfridge and Co.), Mr. E. M. Gamage (Messrs. Gamage), and Annan Bryce, M.P. The discussion which followed the Paper was contributed to by Mr. Gordon Selfridge, Mr. John Murray [*F.*], Mr. R. Millbourne, Mr. Vincent Harris [*F.*], Mr. H. J. Clarke, Mr. Edwin T. Hall [*F.*], Sir Henry Tanner [*F.*], Mr. J. J. Joass [*F.*], Mr. Robt. Atkinson [*F.*], and the President. Reference was made by several of the speakers to the vexatious and wholly unnecessary restrictions imposed by the London Building Act, which handicap very heavily the reasonable development of building property in London, and it was suggested that a strong Committee should be set up to devise ways and means of bringing about some amendment of the Act. Mr. Hall's Paper, together with some of the illustrations and the discussion, will be published in the next number of the JOURNAL.

Attendances at Council Meetings : Nominations for the House List.

Mr. SYDNEY PERKS, F.S.A. [*F.*], at the Business Meeting of the 1st inst. duly brought forward the resolution of which he had given notice—viz. : "That in the opinion of this Meeting no member should be nominated by the Council for re-election unless he has attended at least half of the Council meetings—this rule not to apply in exceptional cases, which should be explained in the JOURNAL."

Mr. Perks said that he hoped this was a harmless resolution, and one which everybody could agree with in principle. If it passed it would not, of course, be binding on the Council, but it would be the expressed opinion of the meeting ; he had worded it so that it should only apply to the Council, though if passed it should apply to the Standing Committees as well. It would be remembered that after the list of attendances was published last year the architectural papers called attention to the poor attendances of certain members of the Council. Yet those members were nominated for re-election by the Council. He had looked up the matter and found that out of a total of 21 meetings two members attended only 7 times, two only 5 times, two only 4 times, two only 3 times, one member only attended twice, one only once, and one member never attended at all. There may, of course, have been exceptional circumstances in those cases : such as illness, or absence abroad. For instance, Mr. Lanchester was now in India, and obviously could not attend. Another well-known member of the Council was doing national work, and was engaged at his office often until 11 o'clock at night ; he would not always be able to attend the Council. He had therefore worded his resolution so that the rule should not apply in exceptional cases. It might be said that one attendance of some celebrated man was as good as ten attendances of another man ; but by no stretch of arithmetic could that argument be applied to a man who never attended at all ! Men who put in such bad attendances

were worse than useless. Not only did they neglect the Institute business, but they kept out other men who might attend to it. He himself had been on the Council and he had found that when the subject of nominations for the next Council was on the agenda, there would be a record attendance. The business being brought forward, someone would say, "Well, gentlemen, we have to make up the House list. All the present members of Council who are eligible, I move that they be nominated." And the man who had perhaps made only two attendances said, "I will second that with pleasure." A large amount of moral courage was required to oppose anything of that sort. At one meeting a man, a personal friend of his, who he was not even aware was on the Council, put in an appearance for the first time that session. Looking at the agenda, and seeing the word "nominations," he knew why his friend had come! It wanted a good deal of moral courage to say, "Here is my friend ——, he has never attended our meetings and I don't think we ought to nominate him." The rule proposed would be very useful to the Council and would protect them from having that strain put upon their friendships. He therefore moved the resolution which was printed in his name.

Mr. A. W. S. Cross, *Vice-President*, seconded. The resolution, he said, was one of such an innocuous nature that, as a member of the Council, he had very much pleasure not only in seconding it, but in welcoming the proposal. It would have the effect of strengthening the Council's hands when the time came to make up the House list of candidates for next session.

The President, having invited discussion on the question and no one rising, observed that the resolution had been proposed in the most moderate and considerate terms, and the Council could take no exception to it. In regard to the last sentence, however, that in exceptional cases the reasons for non-attendance should be explained in the Journal, that, he felt, would lead them into difficulties. Could they imagine that anybody whom they wished to elect to the Council and who had had his case "explained" in the Journal would ever consent to take his seat on that Council again? Personally, he did not. As far as non-attendances went, the Council were in a difficult position. Many men—often by reason of their eminence in the profession and the constant duties which that involved—found it difficult to attend regularly. Still, the Institute as a whole was glad to have those men on the Council, knowing that they could be called upon on any special occasion when their advice and assistance were wanted. Their names were a valuable asset to the Institute and their advice and services when specially required were still more valuable. Attendance at the meetings of the present Council was extraordinarily good. There had never been such regular, such interested and devoted attendance as now. (Applause.) He could vouch for that without any hesitation at all. Speaking on behalf of the Council he would offer no opposition to the resolution; he thought it would, if anything, strengthen the Council's hands. If Mr. Perks would withdraw the words "which should be explained in the Journal," no one need hesitate to accept it.

Mr. Perks and his seconder having agreed to the suggestion, the resolution as amended was put to the vote and was carried unanimously.

The Present Method of Banning Competitions.

The following letters are published at the request of the Hon. Secretary of the Competitions Committee:—

Northern Architectural Association, 6, Higham Place, Newcastle-upon-Tyne: 2nd March, 1920.

The Secretary R.I.B.A.,—

Dear Sir,—The Council of this Association have had before them your letter of the 19th inst., instructing members of the Institute not to take part in the Skipton War Memorial competition. Having regard to the large number of competitions for public works where the conditions are unsatisfactory my Council has decided to ask the Institute—

1. Whether some method can be devised whereby all conditions of competition for such works shall be submitted to the Royal Institute before the competition is advertised.

2. The advertisement in each case to distinctly state that the conditions have been approved by the Royal Institute.

3. That members of the Royal Institute who apply for such conditions where this approval does not appear in the advertisement shall be deemed to be guilty of unprofessional conduct.

I am requested to say that the existing method of banning competitions after the conditions have been issued and after would-be competitors have in many cases paid their guineas for copies of the conditions with the consequent encouragement thus given to the promoters of such competitions, is in every way unsatisfactory.

Yours truly,

Geo. T. Brown,
Hon. Sec. Northern A.A.

15th March, 1920.

Geo. T. Brown, Esq., Hon. Sec. Northern A.A.,—

Dear Sir,—Your letter of 2nd March to the Secretary R.I.B.A. has been before my Committee for consideration, and they instruct me to reply as follows:—

The Competitions Committee is aware that the present method of banning competitions is not entirely satisfactory, but you will realise I am sure with us that any alternative method is at the present time impracticable. As to the points you raise:—

1. The Committee considers that the R.I.B.A. could not well set themselves up as the only body suitable to judge of the conditions for competitions, and insist upon such conditions being first sent to them and approved before being made public. So long as the Society of Architects and other bodies are in separate existence they can state a case along these lines as well as the R.I.B.A. If, however, subsequently these bodies become merged under one head it might be practicable to carry out some such suggestion as you make.

2 and 3. These would then naturally follow.

The Committee, however, wish me to point out that members of the Institute who receive conditions for competitions which are not in accordance with the conditions laid down by the R.I.B.A., should at once forward those conditions to the Institute, which will take the necessary steps to get them put in order. Members, however, who neglect to follow this obvious course and pursue the preparation of drawings where conditions are unsatisfactory have no cause to complain as far as the Institute is concerned if later they find the competition banned. Every endeavour is being made to protect the interests of members, and it is reasonable to expect their co-operation to this end. It would be well, I think, if you, as Secretary to the Northern Architectural Association, would be good enough to make public this position and use your best endeavours to inform us as early as possible of any irregular conditions for competitions within your area.

Yours very truly,

Herbert A. Welch,
Hon. Sec. Competitions Committee.

Housing: Points settled by the Ministry of Health.

Housing, the organ of the Housing Department of the Ministry of Health, gives in its issue of 1st March the following information on points arising in the Ministry's correspondence :—

BUILDINGS.—*Materials—Damp-proof Course.*—A cement and sand damp course would not be regarded by the Ministry as satisfactory, whatever waterproofing compound might be used. A course so constructed would be simply an ordinary brick joint, and might not be thicker than the other joints. It is necessary for a damp course to be composed of either an elastic waterproof material or of an impervious, tough material which will not crack with the smallest degree of settlement in the wall.

Construction—Walls.—A local authority proposed to build houses with walls built with bricks on edge, with an intervening cavity of two inches, and having the two thicknesses tied together by ordinary wall ties.

The Ministry saw no objection to the proposal if sufficient wall ties were used. There should be not less than six ties to every superficial yard in courses every 12 inches high.

There should also be a solid beaming, both at first floor and roof level, to receive the floor and roof plates. This solid beaming must be of the full thickness of the wall, with a bitumen or other damp course to carry away condensed moisture on the inner face of the outer skin to the exterior. The wall would have the same foundation as is required in the Standard Specification, and must be filled in solid from the foundation concrete up to within three inches of the damp courses, which must be separated for each part of the wall.

INTERPRETATION.—*Regulations under Section 1 of the Housing (Additional Powers) Act, 1919—One-Storey Dwellings.*—The Ministry consider that in the case of one-storey buildings, in respect of which a grant is applied for under Section 1 of the Housing (Additional Powers) Act, 1919, the rooms may be dealt with under Part 1 (*c*) of Schedule I. of the Regulations governing the grants. It should, however, be stipulated, where necessary, that the head of the windows shall be not lower than 6 feet 6 inches, as provided in Clause 48 of the Ministry's "Manual on the Preparation of State-aided Housing Schemes," and that proper headroom against the walls shall be provided for furniture in accordance with 7 of Appendix IV. of the Manual.

FINANCE.—*Extra Remuneration to Permanent Employees of Local Authority.*—The scale of remuneration under III. of General Housing Memorandum No. 2 does not include remuneration for preparation of quantities, which may be paid for at half the rate allowed to outside surveyors by II. of General Housing Memorandum No. 4, subject to the limitation as to total remuneration imposed by (*b*) of General Housing Memorandum No. 2.

Conversion of Houses into Flats: Relaxation of By-laws.

The communications which passed between the London County Council and the London Housing Board on the question of the relaxation of building by-laws in connection with the conversion of houses into flats have resulted in the production of a scheme by the officers of the two bodies which has secured the approval of the Council and of the Ministry of Health. Particulars of the scheme are set out in the recommendation of the Building Acts Committee of the London County Council which came up for consideration at the L.C.C. meeting on the 9th inst. and was adopted as follows :—

That the application to schemes for the conversion of houses into flats under the instructions of the London Housing Board of the resolution No. 1 (*a*) of 7th October, 1919, with regard to the conversion of houses into flats be terminated, and that the following arrangements with the London Housing Board with regard to such schemes be approved :—

(i) That in all cases of buildings exceeding 2,500 square feet in area, shop premises exceeding 1,000 square feet in area and buildings exceeding 125,000 cubic feet, in which the London Building Act, 1894, requires fire-resisting construction and the provisions relating thereto are relaxed, the following requirements will be insisted upon by the London Housing Board in approving plans : (1) The main staircases to be protected from direct risk of fire from all rooms (*i.e.*, the approach from any room to the main staircases to be by way of a corridor or lobby) ; (2) such staircases, where not already enclosed, to be enclosed with fire-resisting material ; (3) access to be provided from the top of such staircases to the roof, and, if possible, to an adjoining roof ; (4) in cases in which approach to the main staircases cannot be arranged by way of a corridor or lobby and the rooms open directly on to the stairs or landings thereto, so that there will be a direct fire risk from any room to the stairs, a screen to be provided to prevent smoke and flame ascending the stairs and thus preventing access to the roof ; and (5) all new enclosures to staircases, including glazing, to be in fire-resisting material, except in the case of doors of $1\frac{3}{4}$-inch deal throughout or doors sheathed with fire-resisting material on the inside.

(ii) That in all cases in which accommodation is provided for more than 20 persons (*i.e.*, two persons a bedroom), the London Housing Board will, in approving plans, require similar provision as regards means of escape and fire protection to be made.

(iii) That in all cases in which access to the roof is required under the London Building Acts, the London Housing Board will require proper access to the roof with the necessary guard rails and protection, or, as an alternative, some other efficient means of escape.

(iv) That in all cases in which a floor is at a height of 50 feet or more above the pavement level, the London Housing Board will require alternative means of escape, independent of the main staircase, from such floors to an adjoining building or to the ground level.

(v) That the London Housing Board will require roofs of shops projecting 7 feet or more to be of fire-resisting construction.

(vi) That if the above suggestions be reasonably carried out the provisions of the London Building Acts (Amendment) Act, 1905, will not be further insisted upon.

(vii) That the London Housing Board will notify District Surveyors of their intention to approve plans of proposed conversions, and will afford them facilities to inspect the plans at Wellington House, Buckingham Gate.

(viii)*

(ix) That in all cases of rooms (not previously occupied as habitable rooms) to be converted into habitable rooms, the London Housing Board will require the provisions of the London Building Act, 1894, as to window areas to be complied with.

(x) That, subject to the above provisions being met, the Council will raise no objection to the non-observance of the provisions of Part VI. of the London Building Act, 1894, so far as regards construction in relation to the works to be carried out and the existing work in connection with such conversions.

(xi) That in the event of a difference arising under the foregoing arrangements between the District Surveyor and the authority carrying out conversion work, the matter in

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* Clause viii was struck out by the Council the clause reading as follows : "That in the construction or formation of a room for habitable purposes in place of a room or space not so previously used, the London Housing Board will require that it shall be at least 8 feet in height throughout half its area."

dispute shall be referred to the London Housing Commissioner and the Superintending Architect to determine, subject to the option of the Superintending Architect to refer any exceptional case to the Council.

The London County Council and the City Churches.

In April 1918 a Commission was appointed by the Bishop of London to inquire into "(*a*) the circumstances of the ecclesiastical parishes and benefices within the City of London in respect to the income of the incumbents and funds available for the maintenance of lecturers and assistant curates and lay church officers, for the maintenance of fabrics of the churches and of the services therein, and for other church purposes in respect of the population resident and non-resident served by the churches respectively and collectively; and in respect to any provision made by special services and other means to extend the usefulness of the churches beyond the mere parochial needs; (*b*) the rearrangement or regrouping of parishes and benefices which might with advantage be promoted under the Union of Parishes Act, 1860, with or without the demolition of churches; (*c*) any other rearrangement of parishes and benefices and the endowment and funds thereof and the application of the churches and the endowments and funds to more extended uses for the benefit of the church and its members which might be made under any existing powers (or powers which might be sought from the Legislature); and to report with recommendations of any action to be taken in relation to those matters." The Ancient Monuments Consolidation and Amendment Act, 1913, made further provision for the preservation of ancient monuments. The London County Council, being a local authority for the purposes of the Act, is directly concerned in the preservation of buildings of historical, architectural or antiquarian interest, and the Local Government Records and Museums Committee of the Council, in a recent report recapitulating the purposes of the Bishop of London's Commission, appended a recommendation that the Council would view with great concern the removal of any church possessing features of architectural, historical or antiquarian interest, and trusts that the Commission would give the most careful consideration to this point of view in connection with their enquiry.

Sale of City Churches.

The Times of the 16th inst. gives the following forecast of the Commission's Report :—

The Commission which is inquiring into the necessity of retaining so many churches in the City has not yet considered its report, though every effort is being made to have it ready for the Bishop of London by Easter.

It is understood, however, that the Commission will not suggest the sale of more than three or possibly four of these churches. They are not likely to desire the destruction of buildings, even if these have no good claim to be spared except their architectural interest.

There are at present about 50 churches in the City, and the resident population is presumed to be about 13,000. Many of them are used extensively for devotional purposes by those who work during the day in the City, and any alterations that may be attempted will be in the direction of increasing rather than diminishing those facilities.

It must not be expected that a large sum of money will be available even if three or four churches are closed and their sites sold. It is not possible to sell any of the ancient churchyards, and the cost of removing and re-interring the dead is generally considerable. It is understood that the Commission are favourably disposed to some of the old isolated towers, which are likely to be spared.

Remaking Ruined France.

Under the above heading, in *The Times* of 11th March, a special correspondent gives an interesting account of the progress which is being made in housing the people who are returning to the towns and villages in the devastated areas :—

The vast majority (he says) are living in ruined houses, which have been "rendered inhabitable"—an elastic expression which may cover anything from a comparatively water-tight cellar to a patched room or two in a building with a tarpaulin roof.

Meanwhile, the problem of lodging homeless inhabitants and imported workmen pending rebuilding had to be faced. The frightful difficulty was that before a town could be rebuilt the ruins had to be cleared. In some cases, indeed, as at Chauny, where the Germans mined the cellars, this was comparatively easy, for instead of a house there is a hole. But it is obvious that one cannot live and build on the same spot at the same time. Consequently there is a population of more than 100,000 living in huts.

The plan adopted has been to erect little villages of huts on open spaces inside, or immediately outside, the town or village to be rebuilt. These huts are of various kinds, not all equally satisfactory. Among them are Nyssen huts—double semi-circular corrugated iron shelters, raised on brick walls some 4 ft. high, with external chimney. These are divided into a living room and two bedrooms; among the objections to them are the absence of any place for washing clothes or keeping rabbits, and the fact that, unless they are lined, the internal iron is damp with condensation. The so-called Swiss huts have a fair-sized living room and bedroom and two smaller rooms, with a kind of verandah in front, which, when partially enclosed, makes a shed; but the double wooden walls do not keep out the cold. Others are built of plaster panels which need constant repair, with roofs of tarred paper which leak · they have two rooms and an unnecessarily large shed at the back.

The "Russian" huts are comfortable; they have double wooden walls, with large air-space, and a cement floor to the living rooms; there are three bedrooms and a shed. Commonest of all are the "semi-temporary" wooden-frame brick houses, with clay joints; in some, the walls are sprayed outside with cement wash; in others, the joints are raked out and pointed with cement; they have three rooms, with cement floors, and a verandah-shed in front or behind. All alike are heated by the iron cooking stoves in the living rooms.

At Marcoing, near Cambrai, an interesting experiment was tried with hollow blocks of an agglomerate of brickdust and cement. The houses are an attractive rose-pink in colour, with four good rooms on the ground floor, attic and cellars. All internal corners are rounded, and the internal walls merely need distempering. The cheapest cost 5,000 francs (£200), and can be built in a fortnight. The entire plan includes 800 houses of this material, with spacious schools forming a group with the Mairie.

At Soissons there are being built a large number of excellent stone houses with red-tiled roofs. One of these houses, consisting of three rooms and a shed, can be built by eight men in a month. They look as if they would last for years.

Of the 14,000 houses in St. Quentin before the war, every single one was hit. Four thousand can be repaired; 6,500 have been rendered inhabitable temporarily; 1,800 brick houses have been built in November and December. It is estimated that the mere clearing up of St. Quentin will

cost 20,000,000 francs (£800,000), and that its rebuilding will come to at least 600,000,000 francs (£24,000,000).

Lens is a more terrible sight even than St. Quentin. It has often been described, and no description approaches the reality. In the midst of the grimy remains of a gigantic game of spillikins a population of 6,600 out of 35,000 is living in surroundings of which we in England can form no conception. There is, however, a hospital. There is also a school, where the children, though backward, as is inevitable after their broken education, look fairly well. The main sewer has been cleaned. What, however, gives thought to the engineers is how they are going to get rid of the water from the pits.

The Nurse Cavell Memorial.

The President, Mr. John W. Simpson, represented the Institute at the unveiling by Queen Alexandra of the Cavell Memorial in St. Martin's Place, Westminster, on the 17th inst. The memorial, which is the work of Sir George Frampton, R.A. [*Hon. A.*], is situated in the middle of the wide roadway between St. Martin's Church and the National Gallery, a short distance to the north of Trafalgar Square. The monument is of granite, specially quarried in Cornwall, and is surmounted by an emblem of Humanity, symbolised by a woman nursing a child. There is a beautiful representation of the tall, graceful figure of the heroine, looking towards the south, and at the foot is the simple inscription: "Edith Cavell, Brussels, Dawn, Oct. 12, 1915." The words "Humanity," "Devotion," "Fortitude," and "Sacrifice" are inscribed on the four broad facias of the monument; and above these are the words "For King and Country," and "Faithful unto Death."

Empire Timber Exhibition, July 5-17, 1920.

The Department of Overseas Trade is organising an Exhibition of Timbers grown within the British Empire to take place at the Holland Park Skating Rink, London, from the 5th July to the 17th July, 1920. The main object of the exhibition is to bring prominently before architects, inspectors, firms who have to specify timbers in their contracts, as well as the users and consumers of timbers, the full range of Imperial grown timbers, and especially those timbers which up to the present are only very slightly, if at all, known in this country. At the same time the exhibition will demonstrate the chief uses for which such timbers are suitable. The classification embraces :—(*a*) Specimens of timber; (*b*) exhibits demonstrating the various uses to which timbers are put, viz., floors, panelling, staircases, furniture, ply-wood, and articles of everyday use; (*c*) wood pulp. A committee has been formed to arrange all details connected with the exhibition, and includes representatives of: Colonial Office, Crown Agents for the Colonies, Government of India, Self-Governing Dominions, Forestry Commission, British Societies interested in the production and utilisation of timber.

Neglect of the Country's Famous Trees.

Mr. Henry J. Elwes, F.R.S., lecturing before the members of the Gilbert White Fellowship recently, said there was a very considerable number of trees in this country whose use had been entirely neglected during the last three or four generations. In old houses in England and Scotland might be seen beautiful cabinets made entirely of English woods, and rooms panelled with oak, much better than they could be panelled to-day. If British architects and builders only knew our resources they would not have to go outside their own parish. He had seen a church in Northumberland in which the pews were made from British cherry; and he had been able to panel a room with the wood from a single cherry-tree that was cut down in Surrey and sold at 4d. a foot. The neglect of the woods from our country was due, he explained, partly to the ignorance of the architects and builders, and partly to the fact that they had been able to obtain unlimited supplies from other parts of the world at little more than the cost of carriage; the result being that they would not take the trouble to look about their own country. Sir John Stirling-Maxwell had told him in a letter that some of the finest Scottish hard woods were being sold as foreign timber, simply because those who drew up specifications stipulated that they must be certain kinds of timber from abroad. There was an immense amount of fraud in all trades connected with timber, some intentional fraud and some through ignorance.—Professor Boulger, in moving a vote of thanks for the lecture, lamented the way in which the trees of the London streets are maltreated by the authorities' employees. Only in the squares of Bloomsbury could they be seen growing in their natural form.

Proposed New Engineering Laboratories at University College.

An appeal is being made with the approval of the Senate of the University of London for funds for the reconstruction and re-equipment of the Engineering Buildings at University College. The Engineering School is the pioneer school in London. It was founded in 1828, and, under a number of Engineers, eminent in teaching as well as in the practice of their profession, has educated a succession of Engineers, many of whom have attained great distinction. The time has now arrived to undertake the reconstruction and re-equipment of the School, and it cannot be deferred without great detriment to its future usefulness and efficiency. The last reconstruction took place in 1893, when the present buildings were erected and occupied. The existing accommodation has become quite insufficient for the number of students now in attendance. Moreover, the teaching of Municipal Hydraulic, Heating and Ventilating Engineering necessitates additional accommodation. Fortunately space for extension is available, and plans have already been drawn for the provision of two additional floors on the present site and the reconstruction of part of the adjacent South Wing in such a way as to provide more lecture rooms and accommodation for the various Departments. Space will also be available for a Hydraulic Laboratory suited to modern requirements, in which the existing teaching of Hydraulic Engineering can be continued under much improved conditions. The Engineering Committee are satisfied that, having regard to the prices which obtain at present, and which are likely to continue to obtain for some time, the sum required for the reconstruction and re-equipment of the buildings is £100,000. Of this sum a portion estimated at £25,000 to £30,000 would be reserved as a Capital Fund to provide an annual

income for the renewal of the equipment of the Department in future years.

The Chairman of the Equipment and Endowment Committee is Sir Alexander B. W. Kennedy, and the Hon. Treasurer Sir Ernest Moir, Bart. Donations may be sent to the President of the Committee, H.R.H. Prince Arthur of Connaught, 42 Upper Grosvenor Street, W., or to the Hon. Treasurer of University College.

Victoria and Albert Museum.

The Department of Paintings and the Department of Engraving, Illustration and Design have received several important bequests and gifts during the past year. Sir Frank Short, R.A., P.R.E., has presented 160 of his mezzotints, aquatints, and etchings, in memory of his son, Captain Leslie Short, who died on active service 3rd June, 1916. This gift, in addition to prints already in the Museum, makes the Museum collection of Short's work probably the largest and most complete in existence. In memory of Sir Charles Holroyd, R.E., late Director of the National Gallery, two of his water-colours and 43 etchings have been given by Lady Holroyd, again making the Museum collection of special value to students. Shortly before her death in 1919, Mrs. Merrick Head—to show her appreciation of the Historical Collection of water-colours in the Museum—presented 17 water-colours and 13 etchings by Samuel Palmer, who, at the beginning of his long career, was in close association with Blake and Calvert. Several of the drawings date from his honeymoon tour through Italy in 1839-1840, and belong to a period of the artist's finest work, not hitherto adequately represented in any public collection. Bernard H. Webb, the architect, was always a warm friend of the Museum, to which, at his death in 1919, he bequeathed all his collections. Among these are a large number of water-colours and pastels of the British School, a considerable collection of drawings by Old Masters, and a large series of modern drawings, etchings and woodcuts. The family of the late Captain Guy Baker, in accordance with his expressed wishes, presented 27 water-colour drawings by Wyndham Lewis. This collection is representative of the artist's work in the years preceding the war, and strikes a modern note among the Museum collections. The same remark applies to a series of drawings presented by Messrs. Ezra Pound and C. Lovat Fraser, showing different phases of the work of H. Gaudier-Brzeska, who died on active service in France at the early age of 24. A selection from these gifts and bequests is on view in the East Hall of the Museum ; and among other gifts there shown are water-colours and drawings by J. Baverstock Knight, H. Edridge, John Glover, Burne-Jones, C. A. Hunt, A.R.W.S., Romilly Fedden, Blamire Young, R.B.A., John Wright, A.R.E., and Lovat Fraser. Among some purchases on view is a series of four studies by Degas for his oil painting in the Ionides Collection of the ballet scene from Meyerbeer's "Roberto il Diavolo."

It is hoped shortly to place on view in Room 132 a large number of other gifts and purchases made during 1919.

The Rome Scholarships.

The Final Examination for the British School at Rome Scholarship and the Henry Jarvis Studentship in Architecture will be held in the rooms of the Institute from the 19th April to the 8th May. All particulars about these Examinations may be obtained from Mr. Evelyn Shaw, Hon. General Secretary, British School at Rome, 54, Victoria Street, S.W.

PROCEEDINGS OF THE COUNCIL.

Meeting of Monday, March 1st, 1920.

Unification and Registration of the Profession.—The Council unanimously approved the Report of the Charter Committee and ordered a Special General Meeting to be summoned to consider the proposals recommended by the Committee. The meeting will be held on 22nd March.

Exhibition of "Lay-out" Plans.—The "Lay-out" Plans which were exhibited at Olympia during the "Ideal Home" Exhibition will be on view in the R.I.B.A. Galleries until further notice.

R.I.B.A. Prize Drawings.—A Selection was made from the Prize Drawings exhibited at the R.I.B.A. in January and will be sent on tour among the Allied Societies in the United Kingdom.

R.I.B.A. War Memorial.—The conditions of a competition, limited to Service men, for the R.I.B.A War Memorial, were settled.

The Ministry of Labour.—Mr. George Hubbard was appointed in place of Mr. Paul Waterhouse as the representative of the R.I.B.A. on the Interviewing Board at the Ministry of Labour.

British Engineering Standards Association.—Mr. Digby L. Solomon was appointed as the representative of the R.I.B.A. on the sub-Committee for the Standardisation of Copper-Alloy Fittings.

Membership.—Four members were re-instated.

ALLIED SOCIETIES.

Birmingham Architectural Association.

A Talk on Housing Schemes.

The Tenth General Meeting of the session was held at the Association's rooms, Royal Society of Artists' Buildings, New Street, Birmingham, on Friday, 5th March. The President, Mr. H. T. Buckland [*F.*], took the chair, and 60 members were present. The proceedings took the form of "A Talk on Housing Schemes," the chief speakers being Mr. Henry E. Farmer [*F.*] (Housing Commissioner for Birmingham and the West Midlands), Mr. W. A. Harvey [*F.*], and Mr. J. Crouch [*F.*].

So much has been said, officially and unofficially, so much has been written on the housing question, said Mr. Farmer, that he did not presume to do more than give a brief address on the subject from a Commissioner's point of view, and even in this he wished to address his remarks to the young architects present, whose opportunities of knowing the position as it appears to him have been necessarily limited by their absence on sterner work, but who now desire, in their patriotism, to do something more for the good of humanity.

The Housing Commissioner asserted that architects had not yet impressed the community with a due sense of their value. The public (and—tell it not in Gath, whisper it only at the gate of the city with the motto "Forward"—many well-fed councillors) are far from clear as to the functions of architects. Architects are modest and unassuming, having turned their pencils into bayonets they fought their way through a bloody war; their fightin

spirit is well alive to-day, and it is up to them not to lie down and lick their sores, but to be up preaching the gospel until the misunderstandings and doubts are removed and housing *is* in their hands, and the people's homes a comfort to live in and a joy to behold.

Dealing with various regulations, the speaker said that Section 1 (3) of the Housing Act, 1919, provided for the employment by a local authority of an architect selected from a panel of architects nominated for the purpose by the R.I.B.A. The net result of the Ministry's policy was that 50 per cent. of the housing schemes were in architects' hands, and it was fair to say that but for the Ministry's action a very small percentage, if any, would have been carried out by architects. How many, or rather how few, houses of the working classes were designed by architects previous to the passing of the Housing and Town Planning Act of last year?

The Ministry laid it down in Appendix 4 of the Manual issued to local authorities on 8th April, 1919, that competent architects should be employed to plan and design the houses to be erected. A scale of charges was agreed with the R.I.B.A., and as no fee was at that time, or until months later, allowed to a Borough Surveyor in respect of plans prepared by him, every inducement was offered to place the work in architects' hands. The officials of the Ministry made it their personal concern to see that this was clear to the Councils, when they were called in: almost immediately, on the site inspection, they issued a questionnaire requiring expert consideration, and asked for the architects to accompany them upon the visit. Time and trouble in dealing with the lay-outs would have been saved if this course had been adopted, and much anguish spared the officials in the filling in of the necessary forms.

This did not apply to Birmingham and some other large towns, where an architectural staff was in existence. The objections raised by various Councils do not appear to warrant the appointment of the Borough Surveyor to carry out this work, and in many instances this excellent official objected strongly to more work being thrust upon him.

The local authorities were entrusted with the carrying out of the housing schemes and guaranteed against any annual loss in excess of the produce of a penny rate. Assistance was also offered to County Councils for housing their employees, and also to approved public utility societies.

The local authorities were at first anxious to proceed, but the subject was new to many, who felt the need of stepping carefully in schemes which must inevitably prove a heavy undertaking. The housing survey was not sent in until 31st October last, and so the general need of each local authority was a little difficult to ascertain; the calculation of an outlying district might be upset by the opening up or closing down of a factory or by the building of a small colony by an adjoining urban authority outside their area. The liability of each district is, it is true, limited to a penny rate, but the need for additional schools and of buildings had to be carefully considered. The need has frequently been felt for a co-ordinating authority to deal broadly with the full matters relating to housing, town planning, transit, arterial roads, etc., for the city and the planetary township which adjoins its boundaries. The whole proposals of surrounding areas should be put before this authority, and unification of methods determined in relation to the great central scheme. It is useless and meaningless to dot garden villages about the boundaries of a great city if no works are in existence, or to be provided for the residents, if transit is neglected.

The Ministry issued a Manual dealing with housing for the guidance of local authorities and their architects, wherein the maximum areas of the ground floor plans were laid down:—

(*A*) Living room, scullery, and 3 bedrooms—maxima, outside 11 inch walls, 578 super.

(*B*) Parlour, living room, scullery and 3 bedrooms, 620 super.

(*B*4) Parlour, living room, scullery and 4 bedrooms, 650 super.

Central passage way not included, and if floors differ on ground and first floor the area of each added together must not exceed twice the super area mentioned.

The general proportions of various types are:—

A	.. .. ..	60 per cent.
B	.. .. ..	35 „
*B*4	.. .. ..	5 „

It has been considered advisable in some cases to allow a proportion not exceeding 5 per cent. of the type *A* with two bedrooms only.

The parlour fight still rages, and is particularly rampant in rural areas, where frequently all parlour types are asked for. It is a far better thing that a family should have a large living room with a bay recess for the children's home-work than that two small rooms should be demanded.

The extravagant waste of cube in the tiled roof is general, and if tiles are desirable the wall plate should be lowered as much as practicable. The unnecessary projections on the score of architectural effect, and the want of appreciation of the effect to be obtained by skilful lay-out, run up the cost. Even the despised "brick box with a slate lid" can be effectively treated so that it becomes a thing of beauty. Gretna and Queen's Ferry illustrate what can be done with a simple standardised type of house laid out by the hand of a master of town planning. The fear of women is *not* the beginning of wisdom in the lavish provision of cupboards. The dresser, mangle, perambulator, etc., should be carefully arranged for on the plan, but we do not want them in the estimate.

Economies in detail must be rigidly enforced, and many sanguinary battles are waged in our architect's lair over such matters as the saving effected by a straight flight of stairs, thus standardised, as also all the doors and windows of a cottage should be.

The w.c. upstairs is nearly always a mistake, with its necessarily expensive plumbing; so also is the lavatory basin in the bath-room.

Other important questions are the grouping of sanitary arrangements, so essential for economy in plumbing; the shallow depth house, as opposed to the more costly building of a square type.

DELAY.—Much delay occurred at first through various causes:—

1. The acquisition of sites—one cannot buy a yard of land over the counter.

2. The quantity surveyor could not, or did not, work to the scheduled time.

3. Some architects either had trouble with their Councils or were too busy.

So, from a variety of causes it became evident that we were not getting the actual houses. All sorts of expedients were suggested, and the sub-editors of *The Daily Mail* put their heads together. Wooden houses did not catch fire in

this region, but all sorts of special construction were suggested, and a large number have been approved by the Ministry. The majority of these are very disappointing. We must interest ourselves in the subject and endeavour to design a house of good special construction on sound commercial lines, keeping in mind the following points:—

1. The lack of skilled labour, which will be still more serious very soon.
2. The difficulty of transport.
3. The necessity for speedy erection.
4. The shortage of bricks and cement.
5. The shortage of plasterers especially.

The Dorman Long system would appear to be the best of the tried special forms of construction.

Housing (Additional Powers) Act, 1919.

It was felt that from a variety of causes the actual building of houses was not proceeding sufficiently rapidly, and so the Housing (Additional Powers) Act was passed on 23rd December last. Under this Act grants to private persons are permissible.

Circular 39B (House Builders) was issued. One of the chief obstacles to the building of working-class houses has been the diversion of the resources of the building trade into other channels. Large arrears of repair work, buildings of less urgency than housing, have been put in hand all over the country, whilst the cry of production has echoed through the streets. How can a man produce under the present conditions? His nights are filled with music, but the "cares that infest the day" do *not* "fold their tents like the Arabs and as silently steal away." He rises unrefreshed and goes sluggishly to work, and we feed him on "production."

The new Act enables a local authority to prohibit "luxury" building, and "luxury" is a wide term. It will be wise for us to consider the position in the light of authentic figures, which show that we have not the skilled labour or the materials ordinarily used in house building to carry us through the projected housing schemes already approved, together with only such outside work as is most urgently required, and therefore we assume that priority for housing will be drastically enforced. The representatives both of the builders and trade unions have agreed to this.

The agreement made between the Minister of Health and the Association of House Builders provides that the builder may submit a plan of land having existing road frontage, or existing road frontage and roads shown that he proposes to construct, with the lay-out of the houses thereon, together with ¼-inch scale drawings of the houses to be built thereon, with a draft specification. The Ministry's Model Specification will be supplied to the builder for his guidance, and the construction of the houses which he proposes to erect shall not be inferior to the standard of the Model Specification. The builder should obtain the approval of the Commissioner both to the plans and to the cost at which the local authority are to purchase.

At the first meeting in Birmingham with the Builders' Association offers for 5,000 houses to be built under this scheme were made by responsible men.

The consent of the builder has been obtained to erect type plans instead of those deposited by him, and at no extra cost, and if the builders proposing to build under this scheme will agree to employ architects who are known to be imbued with a strong horse sense as to economy of construction, many difficulties will be overcome. Just now, with interest so centred on cost, the strictly practical man may neglect the all-important matter of design and appearance, and unsightliness may creep in. There is no danger of the new street of to-day becoming the slum of to-morrow, but there is a very real danger that this street may become as baldly uninteresting and depressing as the streets of houses built by the so-called practical builder of yesterday.

Subsidy.—The Ministry of Health Memorandum defines the conditions on which grants will be paid to private persons or bodies of persons constructing houses under the Housing (Additional Powers) Act, 1919. The object of the subsidy on which an expenditure of 15 millions for the United Kingdom is authorised is to secure the erection of 100,000 houses during this year.

In order to rank for grant a house must be begun after the 23rd December, 1919, and completed before the 23rd December, 1920, but it is provided that if the house is completed between 23rd December, 1920, and the 23rd April, 1921, a reduced grant will be payable provided the Minister is satisfied that the failure to complete the house by the 23rd December, 1920, is due to circumstances over which the person constructing the house had no control.

The amount of grant payable will be:—

(*a*) In respect of houses containing living room, parlour and three or four bedrooms, and comprising not less than 920 super feet of *floor* area, £160 per house.

(*b*) Living room and three bedrooms, 780 super feet *floor* area, £140 per house.

(*c*) Living room and two bedrooms, 700 super feet, £130 per house.

The number of two-bedroomed houses in any district will be limited.

If a form of construction is employed for which, in the case of a local authority's scheme, the Ministry of Health will not sanction a loan for a period exceeding 40 years, the amount of grant per house will be reduced by *one-third*.

It is a condition of the grant that the houses shall comply with the conditions as to planning and construction which are laid down in the Schedule of the Memorandum; the number of houses per acre must not exceed 8 in agricultural areas, in other areas the standard should be 12, but on land partly developed it will be within the discretion of the local authority to allow a larger number not exceeding 20.

The prescribed conditions allow as much latitude as is consistent with the conditions required under State-aided schemes.

In order to obtain a grant, a person must, before beginning to build, submit plans to the local authority, and obtain from them a certificate (Certificate A) authorising the construction of the houses and specifying the grants which will be payable if the conditions are complied with. When the houses are completed he must obtain another certificate (Certificate B) from the local authority certifying that the houses have been completed fit for occupation in a proper and workmanlike manner, and this certificate will show the date of completion. With these certificates the person concerned will apply to the Ministry of Health for the grant which the Minister will pay.

A fortune awaits the architect who invents a construction in which an entirely new and reasonably cheap material can be used.

Mr. J. Crouch emphasised the importance of lay-out. Even quite plain houses may in time come to look all right if the lay-out is well planned. Generally speaking, in a large scheme the existing main roads and the necessity of

linking up the various outlying districts will suggest the main lines to be followed in working out a scheme; the natural features, the desire to preserve or emphasise, provide further motives, and imagination and experience do the rest.

Many of our existing garden suburbs fail because their designers neglected to provide definite points of interest in their scheme. It is of the utmost importance to provide one or more dominating features.

In regard to house plans, the Tudor Walters Report set a high standard, but the cost of many of the schemes frightened the authorities at Whitehall, and lately there has been a tendency to lower the standard set up in the earlier instructions.

Mr. J. P. Bridgwater, M.S.A. (of Messrs. Ingall, Bridgwater and Porter, the winners of the City of Birmingham Selly Oak Road Site Housing Competition), in proposing a vote of thanks, said he thought Mr. Farmer's address was evidence of his willingness to render all the help he could to architects within his region.

The Government allowance of 30 per cent. to public utility societies seems insufficient; on that basis an economic rent for the houses would be three times pre-war rent, and people could not be expected to pay such an increase. In Birmingham, the £850 house would have to let at 33*s.* per week, inclusive of rates at 17*s.* in the £.

While 50 per cent. of the housing schemes are being carried out under architects' supervision, it is up to us as individual architects and as an Association to prove that it is worth while for Housing Committees to employ us. The financial problem is the one on which Housing Committees are laying chief stress, and it was suggested that it might be an advantage to erect houses which, while not being extra in cost, would still have some æsthetic value.

In concluding, Mr. Bridgwater said he thought that instead of 50 per cent. the whole of the houses should be in the hands of trained architects; better results, he was sure, would be obtained.

Mr. A. Harrison [*F.*], in seconding the vote of thanks, called attention to the Pine Apple Farm Housing Scheme Competition. When architects were first asked to compete the conditions were such that no self-respecting man could submit designs. Modifications were subsequently made, however, almost at the last moment, and a number of architects sent in plans. Mr. Harrison's plans were placed first, but more than six months elapsed before he received instructions of any kind. As one might expect, during this lapse of time prices had increased very considerably, and the estimates had to be accordingly revised.

Major Travers and other members spoke in support of the vote, which was afterwards put to the meeting and unanimously carried.

The Ulster Society of Architects.

The Report just issued of the Council of the Ulster Society of Architects is the first issued since 1915. The Society continues to progress, and with the acquisition of a number of new Members and Associates is numerically stronger than at any previous period of its history. During the war the work of the Council consisted in a large measure of work in connection with enlistment, rationing of materials, distribution of materials after the war, &c., in conjunction with the Ministry of Public Health and the War Committee of the Royal Institute of British Architects. Sixteen of the Members and Associates and students joined His Majesty's Forces in different capacities, and out of the number four made the supreme sacrifice. The Council, in conjunction with the Belfast Builders' Association, has revised the Conditions of Contract, which have now been brought up to date in accordance with the altered conditions prevailing. The new Conditions have been approved by the general body of the society, and will in future form the basis of agreement in all contracts made between the members of the Ulster Society of Architects and the Belfast Builders' Association. At the invitation of the Library and Technical Committee of the Belfast Corporation to cooperate with them in forming a syllabus for the Architectural Course at the Technical Institute, a sub-committee of the Council, in conjunction with the Principal of the Institute, drafted the syllabus, and this has been in operation since 1916. Suitable rooms for the society's meetings have been secured at Messrs. Johnston, Graham & Co.'s offices, 8, Ocean Buildings. When the Belfast Housing Scheme was in process of formation under the Housing of the Working Classes (Ireland) Act, the Council approached the Belfast Corporation urging that the work should be entrusted to a Board of Architects chosen by the Corporation from the members of the society. The Corporation adopted the suggestions, and the personnel of the Board chosen by the Corporation has been approved by the Local Government Board for Ireland. The plans have been prepared, together with the specifications and bills of quantities, and are now awaiting the instructions of the Housing Committee for the taking of tenders. It is hoped that building operations will commence at an early date. The Londonderry Committee of the society has secured the Londonderry Housing Scheme on lines similar to the Belfast agreement. The reports show that the Londonderry Committee is in a very sound condition, and the society is to be congratulated on having such a loyal committee in charge of the northern district of Ulster.

MINUTES. X.

At the Tenth General Meeting (Ordinary), held Monday, 15th March 1920, at 8 p.m.—Present: Mr. John W. Simpson, *President*, in the Chair; 29 Fellows (including 10 members of the Council), 44 Associates (including 3 members of the Council), 10 Licentiates, and numerous visitors—the Minutes of the meeting held 1st March 1920, having been published in the JOURNAL, were taken as read and signed as correct.

Mr. Wilfrid Lawson [*A.*], attending for the first time since his election, was formally admitted by the President.

The Hon. Secretary announced the decease of the following Licentiates: George Ogden and Arthur John Pearson Carrington.

A Paper on THE PLANNING OF SOME AMERICAN DEPARTMENT STORES by Mr. H. Austen Hall [*F.*], *Godwin Bursar* 1919, having been read by the author and illustrated by lantern slides, a discussion ensued, and on the motion of Mr. Gordon Selfridge, seconded by Mr. John Murray [*F.*], a vote of thanks was passed to Mr. Hall by acclamation.

The proceedings terminated at 10.15 p.m.

Appointments.

The Senate of the University of London, acting on the recommendation of the Institute Council, have appointed Mr. Paul Waterhouse, M.A.Oxon. [*F.*], and Mr. Arthur Keen [*F.*] to be members of the Architectural Education Committee of the University of London for the year commencing 1st March, 1920.

Mr. E. C. P. Monson [*F.*] has been appointed a member of the Light Castings sub-committee under the Building Materials Committee of the Profiteering Act Department.

COMPETITIONS.

Hornsey War Memorial.

The Competitions Committee desire to call the attention of Members and Licentiates to the fact that the conditions of the above competition are unsatisfactory. The Committee are in negotiation with the promoters in the hope of getting the conditions amended, and meanwhile they advise Members and Licentiates to take no part in the competition.

Peterborough and District War Memorial: New Infirmary.

The President has appointed Mr. Edwin T. Hall as Assessor in the above competition.

THE EXAMINATIONS.

Building Surveying.

Examinations for Certificates of Competency to act as District Surveyor under the London Building Acts, 1894-1909, and as Building Surveyor under Local Acts and Authorities, will be held in London on April 28th, 29th and 30th, 1920. Applications should be sent to the Secretary R.I.B.A. on or before April 12th.

The Country's Town Planning Schemes: Exhibition of Drawings at the Institute.

At the suggestion of Professor S. D. Adshead [*F.*], the Council have decided to exhibit in the R.I.B.A. Galleries the town plans and layout schemes prepared under the Housing Acts which were a prominent feature of the recent exhibition at Olympia. These drawings have been contributed by architects from all parts of the country, and some fifty important schemes are included. The exhibition will be open from 10 a.m. to 6 p.m. daily till further notice.

Palestine Exploration: Volunteers Wanted.

Sir Frederic Kenyon writes: "Notice has recently appeared in the Press to the effect that the British School of Archæology at Jerusalem is shortly about to commence active work in Palestine. The Director is proceeding to Palestine in a few days from now, and the organising committee is anxious to hear of volunteers who would like to take part in the early work of exploration to be undertaken this summer. Such volunteers should be university graduates, should preferably have served in Palestine or Mesopotamia, and should be possessed of good health; it would also be a great advantage that they should have at their disposal a motor-cycle and side-car. Applications and inquiries should be addressed to the Secretary of the School, 2, Hinde Street, Manchester Square, W.1."

Professional Notice.

Mr. Theodore Fyfe [*F.*] has opened an office at 2, Gray's Inn Square, W.1. Telephone, 2126.

ARCHITECT (A.R.I.B.A.), energetic and capable, with many years' varied experience, including quantities, and who has carried out large and important work, desires Partnership in an office with good prospects, or appointment as Chief Assistant with a view to Partnership.—Address Box 4220, c/o Secretary, R.I.B.A.

NOTICES.

Special General Meeting, 29th March: Election of Royal Gold Medallist, 1920.

A SPECIAL GENERAL MEETING will be held Monday, 29th March, 1920, at 8 p.m., for the following purpose:—

To elect the Royal Gold Medallist for 1920. The Chairman to move "That subject to His Majesty's gracious sanction the Royal Gold Medal for the promotion of Architecture be presented this year to M. Charles Louis Girault, Membre de l'Institut de France [*Hon. Corr. M.*], in recognition of the merit of his executed work."

General Meeting (Ordinary), 29th March: Higher Buildings for London.

The ELEVENTH GENERAL MEETING (Ordinary) of the Session 1919-20 will be held Monday, 29th March, immediately following the above Special Meeting, for the following purposes:—

To read the Minutes of the meetings held Monday, 15th March; formally to admit members attending for the first time since their election.

To read the following Paper:—

HIGHER BUILDINGS FOR LONDON.

By DELISSA JOSEPH [*F.*].

General Meeting (Ordinary), 12th April: Architecture in India.

The TWELFTH GENERAL MEETING (Ordinary) of the Session 1919-20 will be held Monday, 12th April, for the following purposes:—

To read the Minutes of the Meeting held Monday, 29th March; formally to admit members attending for the first time since their election.

To read the following Paper:—

ARCHITECTURE IN INDIA.

By JOHN BEGG [*F.*].

R.I.B.A. KALENDAR, 1919-20.—*Erratum:* The date of Mr. Delissa Joseph's election to the Fellowship is 1889, not 1899 as printed.

ASSISTANT required for firm of Architects in Cape Province, South Africa. Immediate. Partner now in London and would interview. Passage paid on 2 years' agreement. Salary, say £30 to £35 per month. Capacity: Making working drawings from sketch plans, specifications from rough notes, quantities and usual routine of a general practice. Ex-Service man with Provincial or Colonial training preferred.—Communicate with Victor T. Jones, F.C.I.A., M.S.A., Constitutional Club, London, W.C.2.

ARCHITECT, with offices Bedford Row district, is prepared to share same. Half of general drawing office and entire use of private room.—Write Box 1320, c/o Secretary, R.I.B.A.

APPLICATIONS are invited for the post of city architect to the Corporation of Calcutta. Salary, 1,500 rupees per month. Candidates must be members of the R.I.B.A. Full particulars are given on page iii. of the advertisements in JOURNAL R.I.B.A. of 6th March.

AN ASSOCIATE, restarting in practice, having a large experience in factory and domestic work, is prepared to assist other architects in his own office. Address, "H. G.," c/o Secretary, R.I.B.A., 9, Conduit Street, W.

PARTNERSHIP.—Architect with work in hand desires Partnership in established practice out of London (southern counties preferred). Willing to purchase or invest.—Address Box 16320, c/o Secretary R.I.B.A.